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Anthropology. Neolithic man of the Campignian stage. Mural painting by Charles R. Knight in the American Museum of Natural History,  
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*The*  
HOME UNIVERSITY  
ENCYCLOPEDIA

—An Illustrated Treasury of Knowledge—

*Prepared under the Editorship of*  
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WITH SPECIAL ARTICLES AND DEPART-  
MENTAL SUPERVISION BY 462 LEADING EDITORS,  
EDUCATORS AND SPECIALISTS IN THE  
UNITED STATES AND EUROPE

COMPLETE IN TWELVE VOLUMES  
VOLUME II

BOOKS INC.  
PUBLISHERS  
*New York*



**FIRST PUBLISHED 1905**

**REPRINTED 1956**

**PRINTED AND BOUND IN THE UNITED STATES OF AMERICA**

# VOLUME II

## Basques

**Basques** (Span. *Bascongados*), a race with a language out of relation to every other European language, whose habitat is now restricted to the west end of the Pyrenees. There seems ground for the assumption that they are descended from the aboriginal race of Europe.

The Basque language belongs to the agglutinative type, modifications of meaning and grammatical relations being denoted, not by inflection or by prepositions, but by adjunction and postfix. To the European the enunciation is about as hard as the grammar. The tongue is differentiated into as many as twenty-five dialects (L. L. Bonaparte), many mutually unintelligible. Among the Basques there are two forms of physique: the one tall, fair, and long-headed; the other short, dark, and round-headed. The two are blended in a long range of proportions, yet, on the whole, the Basques are rather taller than the average of the people of Spain. The Basques are further distinguished by their vigor and hardihood, sobriety and industry, gayety, proneness to sing, dance, and play games, by their frankness, hospitality, pride, love of independence, and promptitude to avenge insult. They are noted as the best sailors of Spain. Peculiar are certain usages, such as the *couvade*, the wearing of the *beret* and the *sinta* (belt), etc.

The literature of the Basques is of very narrow compass. There are some five hundred volumes in the Basque language, nearly all translations from Latin, French, and Spanish.

The population is reckoned at about 610,000.

See Michel's *Le Pays Basque: sa Population, sa Langue* (1857); Garat's *Origines des Basques de France et d'Espagne* (1869); J. F. Blade's *Etudes sur l'Origine des Basques* (1869); Dorothy Canfield's *Basque People* (1931); S. de Madariaga's *Genius of Spain* (1932).

**Basra**, **Bassora**, or **Bussorah**, town, Asiatic Turkey, a place of historic note in Arabic literature; p. 18,000.

**Bas-relief** (Fr. 'low relief'), or **Basso-rilievo** (Ital.), in sculpture, a form of relief in which the figures or objects represented are raised upon a flat surface or background, slightly projecting, so that no part of them is entirely detached from it. See Sir C. Eastlake's *Basso-rilievo*.

**Bass**, in music, is the lowest and most important part of all harmony. Bass is also the name given to the lowest male voice.

## Bassia

**Bass**, the name given to several fishes, both fresh-water and marine, allied to the perch. In the United States the name commonly refers to the large-mouthed and the small-mouthed black bass of the sunfish family (Centrarchidae). Both are excellent eating and have been extensively cultivated and transplanted. Various smaller species, as the grass bass and red-eye bass, abound in the streams of the Mississippi Valley. The salt-water bass include many species of Serranidae, of which the original 'bass' (*Morone labrax*) of the European coast is a typical example. Consult Henshall's *Book of the Black Bass*.

**Bassano**, or **Jacopo da Ponte** (1510-92), Italian painter, called IL BASSANO from his birthplace. He is noted as the first Italian genre painter and the first who treated landscape in the modern spirit.

**Bass Drum**. See *Drum*.

**Basse**, or **Bas**, **William** (d. 1653), English poet, chiefly known by his *Epiaph on Shakespeare* (1633).

**Bassein**, town, British Burma. It has a large trade in rice and is one of the chief ports of Burma. The leading industries are pottery making and umbrella manufacture; p. 45,662.

**Basses-Alpes**, department of France, in the southeastern part. The climate is severe, except in the lower valleys, where even the olive tree grows; p. 83,200.

**Basses-Pyrénées**, the most southwesterly department of France, forming the boundary of Spain. The inhabitants, Basques and Bearnais, have for centuries kept their characteristic customs, especially in the mountainous districts. Pau, the capital, and Biarritz are noted health resorts; p. 415,797.

**Basset Hound**, a breed of hunting dog originating in France, which resembles a dachshund in appearance.

**Bassett**, **John Spencer** (1867-1928), American educator and historian, was secretary of the American Historical Society from 1919 to 1928. His many published works include *Constitutional Beginnings of North Carolina* (1894), a series of papers on slavery in the colony and state of North Carolina; *A Short History of the United States* (1913); *The League of Nations, A Chapter in World Politics* (1928); *Makers of a New Nation* (volume 9 of 'The Pageant of America,' 1928).

**Bassia**, a genus of tropical trees, of the order Sapotaceae, found in the East Indies

and Africa. From the seeds of several species a vegetable oil much used in the manufacture of soap is obtained, and their fleshy flowers yield an intoxicating spirit when distilled.

**Bassoon**, an important orchestral wood wind instrument, the successor to the bombard of the 16th century. It forms the bass of the whole family of wood wind instruments, among which it occupies a position similar to that of the 'cello among the strings. In general, the tone of the instrument is tolling and peculiar. For the production of grotesque effects it is especially useful, having indeed been called 'the clown of the orchestra' (Prout).

**Bass Strait**, the channel between Tasmania and Victoria, Australia.

**Bastian, Henry Charlton** (1837-1915), English physician, advocate of the theory of the spontaneous generation of life among the lower organisms. His publications include *The Modes of Origin of Lowest Organisms* (1871); *A Treatise on Aphasia* (1898); *Origin of Life* (1911).

**Bastien-Lepage, Jules** (1848-84), French realistic painter, painted the *London Bootblack*, a *London Flower-girl*, *The Beggar*, one of his best productions. His influence on modern painting was far-reaching and beneficial.

**Bastille**, a term applied in the Middle Ages to a tower or bastion, but now associated chiefly with the great and dreaded Bastille of Paris, in which persons obnoxious to those in



*Bas-reliefs from the Parthenon, Athens.*

**Basswood**, a name applied to the American linden. See **LINDEN**.

**Bast**, in botany, a structural element in the stem of dicotyledons and gymnosperms. In most plants long, tough, elastic fibres form part of the bast, and it is on this account that it has economic value. The linden tree (*Tilia*) is specially rich in these fibers. Flax, hemp, and jute are bast fibers of different plants.

**Bastard**, one born out of lawful wedlock; an illegitimate child. By the common law of England and the United States a bastard is *nullius filius*, i.e. deprived of all the advantages of consanguinity. He cannot therefore inherit real property from any source nor can he transmit by descent to collateral relations. In some localities statutes have been enacted permitting a bastard to inherit from the mother and to transmit property to the mother by inheritance or under the statutes of distribution. See **ILLEGITIMACY**.

**Bastian, Adolph** (1826-1905), German ethnologist. His greatest work is *Die Völker des östlichen Asien* (1866-71), a colossal collection of facts of religious, ethnological, and psychological interest.

high place were summarily incarcerated on the strength of a *lettre de cachet*. The story of its downfall is told in Carlyle's *French Revolution* and Dickens' *A Tale of Two Cities*.

**Bastion**, a fortification so designed that a flanking fire could be directed along every rampart and ditch from other parts of the same fort. See **FORTIFICATION**.

**Basyle**, in chemistry, the simple or compound substance which forms the electro-positive constituent of a salt.

**Bat**, a small furry mammal belonging to the order Chiroptera and characterized by the possession of the power of true flight, but otherwise nearly related to insectivores. Bats are widely distributed over the surface of the globe, are nocturnal in habit, and are divided, according to their diet, into two sub-orders—(1) *Megachiroptera*, large fruit-eating bats; (2) *Microchiroptera*, small insect-eating bats. Bats form an order of great interest and some economic importance in so far as the one set destroy fruit crops, and the others make up for this by destroying insects, while only a very few, notably the vampire bat, are

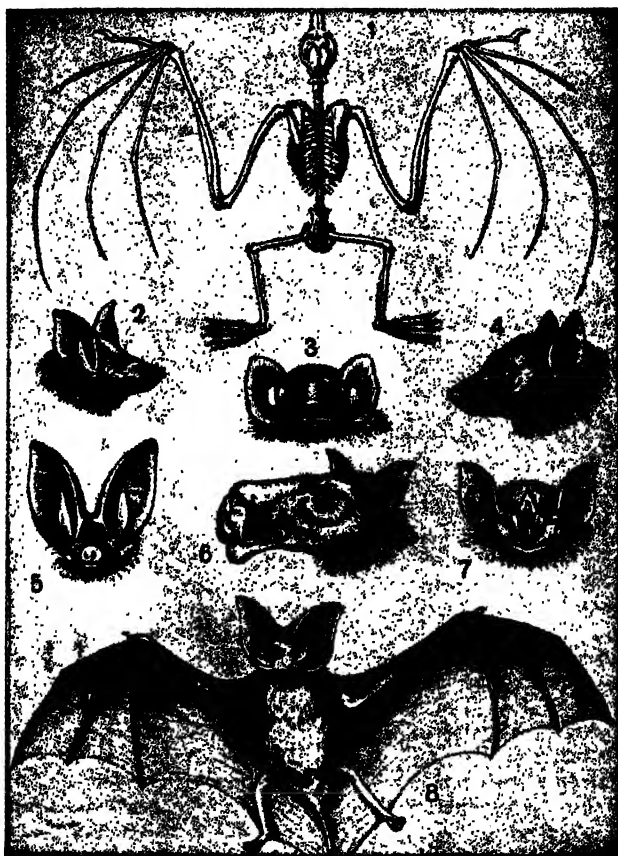
somewhat more sanguinary. See also FRUIT BAT.

**Bataan**, province, Luzon, Philippine Islands; area, 517 sq. mi; p. 92,901. In World War II, defending American and Filipino forces under Gen. Douglas MacArthur were

comprising the **Batan Islands**; area, 76 sq. m.; p. 10,705; capital, Basco (p. 2782).

**Batangas**, province, Luzon, Philippine Islands; area, 1191 sq. m.; p. 442,034; capital, Batangas (p. 53,560).

**Batavi**, according to some a Celtic, but



Bats.

1. Skeleton of fruit bat (*Pteropus jubatus*). 2. Mouse-colored bat (*Vespertillio murinus*). 3. Noctule (*Vesperugo noctula*). 4. Kalong (*Pteropus adulis*). 5. Long-eared bat (*Plecotus auritus*). 6. Hammerheaded bat (*Hypsignathus monstrosus*). 7. Greater horseshoe bat (*Rhinolophus ferrum-equinum*). 8. Geoffroy's nyctophile (*Nictophilus Geoffroyi*).

defeated in April 1942 by Japanese; retaken by Americans in Feb. 1945. Capital, Balanga (p. 13,120).

**Batak** or **Batta**, a tribe of Malays found chiefly on the eastern coast of Sumatra, East Indies, are democratic in their institutions, and show a relatively high civilization.

**Batanes**, province, Philippine Islands,

more probably a German tribe, who originally inhabited the 'island of the Rhine.'

**Batavia**, the old name for Holland, from the Batavi, a Teutonic tribe.

**Batavia**, city, Indonesia. See **Djakarta**.

**Batavia**, city, Genesee county, New York; p. 17,799. It manufactures shoes, flavoring extracts, and farm machinery.

**Bates, Arlo** (1850-1918), American author. He was graduated (1876) from Bowdoin College, after which he lived in Boston, Mass. He edited, 1878-9, *The Broadside*, a civil service reform paper, and was editor of the Boston *Sunday Courier* from 1880 until his appointment (1893) as professor of English literature at the Massachusetts Institute of Technology. His published works include *Patty's Perversities* (1881), *The Pagans* (1884), *The Philistines* (1889), *The Intoxicated Ghost* (1908).

**Bates, Katharine Lee** (1859-1929), American author and educator. She is the author of *The College Beautiful, and Other Poems* (1887), *Rose and Thorn*, fiction (1889), *The Pilgrim Ship* (1926); and words to the song *America, The Beautiful*.

**Bates College**, a coeducational institution at Lewiston, Maine, founded in 1864, an outgrowth of Maine State Seminary.

**Batfish**, any of the several species of small carnivorous fishes of the family Malthidae. Most of the time they rest upon the seabottom supported upon their leglike pectoral fins.

**Bath**, city, England, in Somersetshire, beautifully situated on the river Avon; a favorite summer resort and much frequented for its waters for which from early times it has been celebrated. The Romans, as shown by excavations since 1875, founded a city here, to which they gave the name of *Aquae Solis*, and in the reign of Claudius, erected magnificent baths; p. 79,275.

**Bath, Order of the**, a famous order in English history instituted (or revived) by George I. in 1725.

**Bathbrick**, a material used for polishing or scouring metallic vessels, knives, etc.

**Batholith**, or **Batholite**. A large irregular rock mass of igneous origin that cooled at considerable depth from the surface, but has since been exposed by erosion of overlying strata.

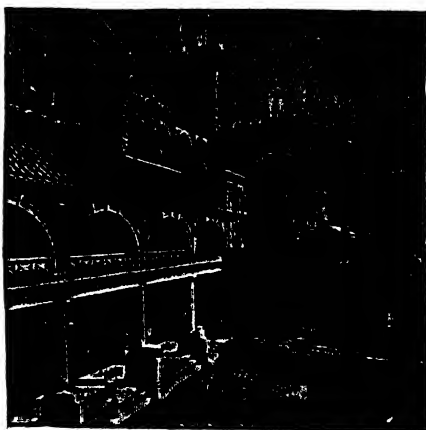
**Bathometer**. See **Ocean and Oceanography**.

**Báthori**, name of an old aristocratic family of Transylvania, who gave to that province several princes, and to Poland one king. **STEPHEN** (1533-86), after ruling Transylvania for four years (1571-75), was elected king of Poland.—**SIGISMUND** (1573-1613) became prince on the death of his father, Stephen.—**ELIZABETH** (d. 1614), a niece of Stephen Bathori, was reputed to be a werewolf. See *Baring-Gould's Book of Werewolves* (1865).

**Bathos**, a ridiculous descent from elevated language to commonplace or absurdity, or a ludicrous want of correspondence between a writer's thought and his expression of it.

Alexander Pope wrote *A Treatise of the Bathos, or the Art of Sinking in Poetry*.

**Baths and Bathing**. The Jews, Mohammedans, and Buddhists observe bathing as a rite; the bath, in religious ceremonial, has



*Bath—Remains of Roman Bath (55 B.C.).*

always been first inculcated in hot climates, where chiefly it is of sanitary value. The Pentateuch and the Koran are full of references to bathing. Both the *Iliad* and the *Odyssey* speak of the hot bath, and the Greeks are believed to have been the first people to use hot air for bathing purposes. The Roman baths were popular lounges; and those of Herculaneum and Pompeii, besides those built by Caracalla in Rome, are examples of the most enduring workmanship of those times.

It is probable that the good effect attributed to many of the fashionable spas and watering-places is due, not so much to the medicinal properties of the bath, except in the case of skin diseases, as to the effect of the same waters used internally, as they generally are, together with a change of air and scene, and a saner scheme of feeding and exercise, as well as the temperature, pressure, and mechanical stimulus of the bath. See *Baruch's Principles and Practice of Hydrotherapy*.

**Bathsheba** ('daughter of the oath'), wife of Uriah the Hittite, afterward of David, and mother of Solomon.

**Bathurst Inlet**, an arm of Coronation Gulf, Northern Canada.

**Bathurst Island**, one of the Parry Islands in the Arctic Ocean, n. of North America.

**Bathurst Island**, mountainous island off the northern coast of Australia.

**Bathybius**, a name given by Huxley to a

supposed protoplasmic organism found in some deep-sea ooze which had been preserved with alcohol.

**Bathymeter, Bathymetry**, the instrument for, and the art of measurement of depth in the sea. See OCEAN.

**Bathysphere**, a hollow metallic sphere having transparent windows, constructed watertight and to withstand great external pressure, for occupancy by men to descend below the surface of water. In use, it is suspended by cable from an attendant ship with which it is connected by air tube and telephone, and is equipped with light projector, air conditioning apparatus and scientific instruments to aid in submarine exploration. Dr. William Beebe has descended 3028 ft. below ocean surface in a bathysphere.

**Batik, or Battik**, a process for coloring textiles, in which the patterns are impressed on the fabric by waxing them over and dyeing the unwaxed parts. It is used for cotton stuffs in India, and for silks and velvets in Europe.

**Batiste**, properly a fabric of very fine and closely woven linen; applied also to a fine cotton fabric.

**Batman**, a term used in the British army, originated in *bat*, a pack-saddle, but is now applied to an officer's servant.

**Baton**, the stick with which the conductor of a choir or orchestra beats the time. The staves of field-m Marshals and drum-majors are also called batons.

**Baton Rouge**, city, Louisiana, capital of the State, and a port of entry, on the Mississippi River; was one of the first French settlements in Louisiana; p. 125,629.

**Batrachia**. See AMPHIBIA.

**Batrachomyomachia**, (Greek, 'The Battle of the Frogs and the Mice'), a mock-heroic poem, in hexameters, erroneously ascribed to Homer.

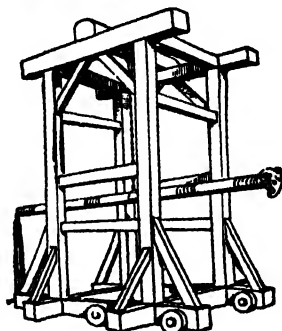
**Battalion**, in the U. S. Army, an organization of two or more (generally four) companies in the Infantry, Engineers, and Signal Corps, and of two or more batteries in the Field Artillery. Two batteries of Heavy Field Artillery and three of Light usually constitute a battalion. The exact strength of a battalion is subject to change with changes in equipment and the conditions under which an army is operating. The infantry battalion is a tactical unit only unless detached from the regiment, in which case it becomes an administrative unit as well. In foreign armies the battalion is the usual administrative and tactical unit. See COMPANY; REGIMENT.

**Battens**, commercially a form of squared

timber from 1 to 4 inches thick, about 7 inches wide, and of any length. On shipboard battens are the strips of wood nailed to the deck to hold down the tarpaulin cover of a hatch.

**Batter**, a backward slope in the face of a retaining wall, to make the plumb-line from the top fall within the base.

**Battering Ram**, an ancient and effective engine of war, for making breaches in the walls of cities and forts. It consisted of a beam of wood, with a ponderous mass of iron or bronze—weighing a ton in some instances—at the head. The wall was rammed by swinging the beam against it, and the blows were timed so that the wall would rock rhythmically, thus aiding in its disintegration.



*Battering Ram.*

**Battery**, the criminal offence of inflicting violence upon another person, is the consummation of an assault. See ASSAULT.

**Battery**, a military term of various meanings. A battery of Field Artillery is the smallest administrative and tactical unit of that branch of the service. In Coast Artillery the term refers to the cannon in position for service; to the structure erected for the emplacing, protecting, and serving of the cannon; and, in a larger sense, to the complete establishment. A light battery has horses only for the guns and wagons, while in horse artillery the men are mounted.

In naval parlance all the guns of a ship are called its battery; the guns on the starboard side are styled the starboard battery; on the port side, the port battery; or guns of the same size, or class, are grouped, as the six-inch battery, or the rapid-fire battery. See ARTILLERY; COAST DEFENCE; FORTIFICATIONS; GUNS.

**Battery, Electric**. See CELL, VOLTAIC.

**Battery Park (THE BATTERY)**, a park in New York City, of 21 acres, at the extreme

southern end of Manhattan Island. See **NEW YORK CITY**.

**Battle.** See **STRATEGY AND TACTICS**; **BATTLES**, **FAMOUS**.

**Battle Above the Clouds**, a name popularly given to part of the Battle of Chattanooga (1863). See **CHATTANOOGA**, **BATTLE OF**.

**Battle Axe**, weapon of warfare used from primitive times down to the era of gunpowder, consisting of an axe blade, diversely shaped, and a handle of varying length. See **HALBERT**.

**Battle Creek**, city, Michigan, has one of the largest sanatoriums in the world; p. 48,666.

**Battle Cruiser.** See **BATTLESHIP**; **CRUISER**.

**Battledore and Shuttlecock**, a child's game played with small racquets and a piece of cork studded with feathers so as to keep it upright while falling, after being struck into the air.

**Battle Hymn of the Republic.** See **HOWE**, **JULIA WARD**.

**Battlement**, a mediaeval defence consisting of a parapet erected round the top of a fortified building, and broken into alternate high and lower parts.

**Battle of the Spurs**, a name given to the victory of the Flemish over the French at Courtrai in 1302; also to the victory of Henry VIII. and Maximilian over the French at Guinegate in 1513.

**Battles, Famous.** Battles have become historically famous not alone because of the size of the armies engaged, or the disproportion between the forces, but sometimes because of the exhibition of a high order of strategy or sublime bravery on the part of a leader or an entire army, and often for the resulting effects of the battle upon the world's history. In the accompanying tables are recorded some of the memorable world's battles on land and sea. Consult Creasy's *Decisive Battles of the World*—with Speed's supplement.

#### FAMOUS LAND BATTLES

Battle	Date	Victors	Vanquished
Marathon . . . . .	490 B.C.	Athenians, 11,000 . . . . .	Persians, 100,000
Syracuse . . . . .	413 B.C.	Syracusans . . . . .	Athenians
Arbela . . . . .	331 B.C.	Macedonians, 47,000 . . . . .	Persians, 150,000
Metaurus . . . . .	207 B.C.	Romans, 50,000 . . . . .	Carthaginians, 47,000
Philippi . . . . .	42 B.C.	Triumvirs, 100,000 . . . . .	Republicans, 100,000
Chalons . . . . .	451	Romans and Visigoths . . . . .	Huns
Carthage . . . . .	533	Romans, 100,000 . . . . .	Vandals, 160,000
Tours . . . . .	732	Franks . . . . .	Saracens
Hastings . . . . .	1066	Normans . . . . .	English
Orleans . . . . .	1429	French . . . . .	English
Berestecko . . . . .	1053	Poles, 100,000 . . . . .	Wallachians, 300,000
Blenheim . . . . .	1704	English and Allies . . . . .	French
Pultowa . . . . .	1709	Russians, 70,000 . . . . .	Swedes, 24,000
Saratoga . . . . .	1777	Americans . . . . .	British
Valmy . . . . .	1792	French . . . . .	Prussians
Austerlitz . . . . .	1805	French . . . . .	Russians and Austrians
Jena . . . . .	1806	French, 100,000 . . . . .	Prussians, 70,000
Friedland . . . . .	1807	French, 80,000 . . . . .	Russians, 70,000
Leipzig . . . . .	1813	Austrians, 300,000 . . . . .	French, 150,000
Waterloo . . . . .	1815	English and Allies . . . . .	French
Gettysburg . . . . .	1863	Federals, 75,000 . . . . .	Confederates, 75,000
Königgrätz . . . . .	1866	Prussians, 200,000 . . . . .	Austrians, 200,000
Sedan . . . . .	1870	Germans, 200,000 . . . . .	French, 150,000
Modder River . . . . .	1899	British, 10,000 . . . . .	Boers, 9,000
Mukden . . . . .	1905	Japanese, 370,000 . . . . .	Russians, 350,000
Marne . . . . .	1914, 1918	Allies . . . . .	Central Powers
Ypres . . . . .	1914, 1915	Allies . . . . .	Central Powers
Verdun . . . . .	1916	Allies . . . . .	Central Powers
Argonne . . . . .	1918	Allies . . . . .	Central Powers
France . . . . .	1940	Germans . . . . .	Allies
Greece . . . . .	1941	Germans . . . . .	Allies
North Africa . . . . .	1943	Allies . . . . .	Germans, Italians
Normandy . . . . .	1944	Allies . . . . .	Germans

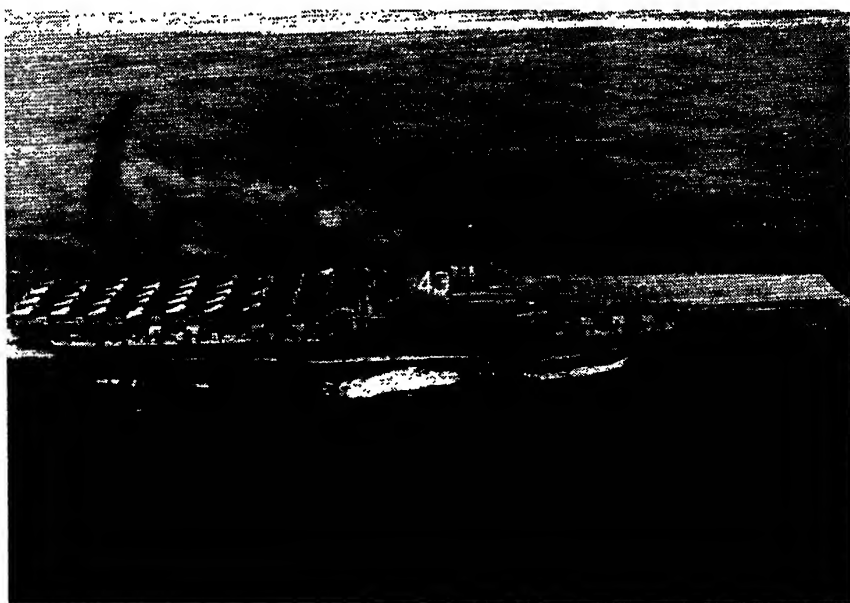
**Battleship**, a naval vessel of the most powerful type, one fit to be placed in the line of battle of the main fighting force of a fleet. Such a ship must have strong powers of offence and defence, and as high a speed as possible without sacrifice of these powers.

During the sailing-ship era the fighting ships carried guns on three or more decks, and were styled line-of-battle ships or ships of the line.

The first steam man-of-war was the *Demologos* or *Fulton* (the first), designed by Fulton and launched at New York in 1814. It was many years before other steam battleships appeared. Paddle-wheels with their exposed

done the same in England. Ericsson's ideas took shape in the *Monitor*, and Cowles designed and built the Danish ship *Rolf Krake*. The latter possessed excellent seagoing qualities, and was a most successful ship for her day. The single-turret *Monitor* was followed by vessels carrying two, three, and four turrets—in many cases mounted high enough above water to give fairly good seagoing qualities.

Though these ships, which were built in the sixties and inspired by the *Monitor*, greatly resembled the *Dreadnaught* type of the present day, for reasons too numerous to mention here



U.S. Navy Photo

Modern battleship, used as aircraft carrier.

machinery were deemed inadmissible, and it was not until Ericsson developed a practicable screw propeller that it became common for the heaviest war vessels to be propelled by steam. The first screw-propelled war steamer was the U.S.S. *Princeton*, built in 1842. The invention of the shell gun for firing explosive shells made some new form of protection against such formidable missiles imperative. Even before the completion of *La Gloire*, which took place in 1859 Ericsson had presented the design of a turret vessel to the French government, and Captain Cowles had

they were not adopted as the best type of their time. They were followed by a multiplicity of types which finally developed (1875-80) into a sea-going armor-clad with two turrets. By 1905 it was realized that the difficulty of fire control of a mixed battery would be greatly reduced, the battle range greatly increased, and the ship's battle efficiency improved if all the large guns were of the same caliber. The result was the all-big-gun battleship of the present day, the first of which was the celebrated British *Dreadnaught*, which has given her name to the type. The American



## FAMOUS NAVAL BATTLES

Battle	Date	Victors	Vanquished
Salamis.....	480 B.C.	Greeks, 370 vessels.....	Persians, 1000 vessels
Actium.....	31 B.C.	Romans, 250 vessels.....	Egyptians, 460 vessels
Lepanto.....	1571	Spanish, 250 vessels.....	Turks, 270 vessels
Armada.....	1588	English, 197 vessels.....	Spanish, 130 vessels
Goodwin Sands.....	1639	Dutch, 110 vessels.....	Spanish, 67 vessels
Dungeness.....	1652	English, 197 vessels.....	Dutch, 98 vessels
The Downs.....	1666	Dutch.....	English
La Hogue.....	1692	Dutch-English, 96 ships..	French, 111 ships
Aboukir.....	1798	English, 14 ships.....	French, 17 ships
Trafalgar.....	1805	English, 31 ships.....	French, 40 ships
Lake Erie.....	1813	Americans, 9 vessels.....	English, 6 vessels
Hampton Roads.....	1862	Federal, <i>Monitor</i> .....	Confederate, <i>Merrimac</i>
Mobile Bay.....	1864	Federal, 14 vessels.....	Confederate forts
Yalu River.....	1894	Japanese, 12 ships.....	Chinese, 10 ships
Manila Bay.....	1898	Americans, 6 ships.....	Spanish, 11 ships
Santiago de Cuba.....	1898	Americans, 5 ships.....	Spanish, 6 ships
Strait of Korea.....	1905	Japanese, 20 ships.....	Russians, 30 ships
Falkland Islands.....	1914	British.....	Germans
Jutland.....	1916	British.....	Germans
Coral Sea.....	1942	Americans.....	Japanese
Saipan.....	1944	Americans.....	Japanese

*Michigan* was actually the first all-big-gun battleship projected, but was laid down after the *Dreadnaught*. Coincident with the *Dreadnaught* was the development of the battle cruiser.

Battleship construction was greatly influenced for several years by the limitations imposed by the Naval Armaments Conferences of 1922 and 1930. The building of the German *Deutschland* in 1932-3 started the first full-scale capital-ship building in ten years.

After 1937 the great powers entered into a large scale naval armament race featuring battleships of 35000 tons, some much larger. Bulges and triple bottoms guard hulls against torpedoes and mines. Heavy horizontal as well as vertical armor protects crucial spots. Construction also contemplates protection against air bombing. The larger battleships have 16 inch guns. Seaplanes and catapults are carried and anti-aircraft guns are important. Speed has increased to upward of 28 knots.

In 1942 after the sinking of the British *Repulse* and *Prince of Wales* by Japanese planes, and of the Japanese *Haruna* by an American plane, Naval constructors turned more to airplane carriers, light cruisers, destroyers and small craft of great speed.

**Battle, Trial by**, the settlement of a dispute by personal combat in accordance with

law. It gradually took the place of trial by ordeal, and was itself slowly supplanted by the modern trial by jury. It was abolished by act of Parliament in 1819. Trial by battle was never employed in the United States.

**Battue**, (French *battre*, 'to beat'), a method of killing game, practised in Europe, in which the birds or animals are driven to a point where sportsmen are stationed, the driving being done by beating the bushes.

**Batu Khan**, (d. 1256), Mongol chief, grandson of Jenghiz Khan.

**Batum**, or **Batumi**, a strongly fortified town and port in the province of Batum, Georgia, on the southeast shore of the Black Sea; p. 70,807.

**Batwa**, an African pigmy tribe, with primitive manners and customs, dwelling on the outskirts of Ndombe, Central Africa, under the protection of the Balunda. The average height of the men is four feet and four inches, of the women about four feet. They are monogamous, and kind to their children.

**Bauang**, or **Bauan**, a municipality of the province of Batangas, Luzon, Philippine Islands; p. 27,729.

**Bauang**, or **Bauan**, town and pueblo of La Union province, Luzon, Philippine Islands. Much pina cloth is exported; p. 39,094.

**Bauble**, a kind of staff or scepter carried by the court jesters of the middle ages. Later

the name was given to a toy used in public merry-making, consisting of a fool's head at one end of a stick and a bladder at the other, with which to belabor the crowd.

**Bauchi**, a province in Northern Nigeria, British West Africa; p. 1,000,000.

**Baucia**. See **Philemon and Baucia**.

**Baudelaire, Charles Pierre** (1821-67), French poet, was born in Paris. He began his literary career as an art critic, and later became editor of a short-lived conservative journal. He translated Poe's tales in 1856-8, and under the inspiration of De Quincey's *Confessions of an Opium Eater*, he published, in 1861, *Les Paradis Artificiels*, describing the sensations of an eater of hashish. He is seen at his best in *Petits Poemes en Prose*, and a collection of clever critical essays entitled *L'Art Romantique*. Consult his *Oeuvres Complètes*; Asselineau's *Charles Baudelaire*; James' *French Poets and Novelists*.

**Baudry, Paul Jacques Aimé** (1828-86), French painter and pupil of Drolling, was born at La Roche-sur-Yon. Consult Van Dyke's *Modern French Masters*.

**Bauer, Bruno** (1809-82), German theological and political critic. As professor at Bonn he published critical works on the Gospel of John and the Synoptic Gospels, in which he stigmatized the evangelical sources as mere fabrications. In his *Kritik der paulinischen Briefe* he denies the authenticity of all the epistles of Paul.

**Bauer, Harold** (1873-1951), English pianist, was born near London. He acquired a reputation both as a soloist and a teacher and has edited some valuable piano music.

**Bauer, Louis Agricola** (1865-1932), American mathematician and physicist, born in Cincinnati, Ohio. He was the Halley lecturer on terrestrial magnetism at the University of Oxford, England, in 1913.

**Bauhin, Kaspar** (1550-1624), Swiss botanist, the first to adopt orderly methods of diagnosing the characters of plants.

**Bauhinia**, (named after the Swiss botanists Kaspar and John Bauhin), a genus of about one hundred and fifty species of tropical plants of the order Leguminosae. Ropes are made from the fibers of the inner bark of some Indian species.

**Baum, Lyman Frank** (1856-1919), American author, was born in Chittenango, N. Y. His chief claim to fame rests on his musical extravaganza, *The Wizard of Oz*.

**Baumé, Antoine** (1728-1804), French practical chemist, was born at Senlis. He was the inventor of many valuable industrial

chemical processes, and devised the Baume system of graduating hydrometers.

**Baumé Hydrometer**, the name applied to two forms of hydrometer (q.v.), one for liquids heavier than water, and the other for liquids lighter than water. For the first, the zero point on the scale is fixed by marking the level at which the instrument floats in distilled water. For liquids lighter than water, the zero point is fixed by the level in a solution of 10 parts of sodium chloride in 90 parts of water. See **HYDROMETER**.

**Baumes Laws**, criminal statutes which went into effect in New York State on July 1, 1926. Two important changes in the criminal code are that persons convicted for the fourth time of felony must serve a life sentence, and that provision is made for a state-wide collection of criminal records, such as fingerprints, Bertillon measurements, etc.

**Baumgarten, Alexander Gottlieb** (1714-62), German philosopher, was born in Berlin. He was the founder of esthetics as a systematic science of the beautiful and an integral part of philosophy. His *Aesthetica* is an elaboration of the system of Wolff as modified by Leibniz.

**Bautzen**, walled town, Saxony, capital of Upper Lusatia (Lausitz), dates back to 928. Here, in 1813, Napoleon defeated the allied Prussians and Russians; p. 41,000.

**Bauxite**, an earthy mineral, grayish white to red in color, an impure aluminum hydroxide. See **ALUMINUM**.

**Bavaria**, or **Bayern**, former kingdom of the German Empire, was declared a republic in 1918, remaining a German state. It is foremost among the German states in agriculture. Area 29,336 sq. m.; p. 7,681,584. On the breakup of the Roman power, Bavaria was ruled by dukes, first elective, then hereditary. After a struggle of two hundred years, Bavaria, absorbed by the Franks, was ruled by Charlemagne, who left his descendants as margraves (788-900).

In 1180 Frederick Barbarossa conferred the duchy on Otto, Count of Wittelsbach, founder of the recent royal house. Maximilian 1. (1598-1623) was made elector, and received the northern half of Bavaria, owing to Tilly's victory over the Elector Palatine. The French defeat of Blenheim (1704) was shared by Bavaria, but after the treaty of Utrecht (1713) the elector was reinstated in his dominions. Thereafter Bavaria oscillated between the French and German alliance, being invaded (1796) by Moreau, who occupied Munich; siding with Napoleon 1., who created Maxi-

milian Joseph I. a king (1805-6); and subsequently, secured in her new dignity by the allies, helping to overthrow her benefactor (1813).

In 1818 Maximilian I. granted his country a constitution, abolished serfdom, and established religious liberty. In November, 1870, a treaty was signed by which Bavaria became a part of the new German Empire. In November 1918 the dynasty was deposed, and Bavaria was declared a republic. See GERMANY. Consult Gotz' *Geographisch-historisches Handbuch von Bayern*; Bronner's *Bayrisches Land und Volk*; Reizler's *Geschichte Bayerns*; Baedeker's *Southern Germany*.

**Bavarian Alps.** See Alps.

**Baviad, The**, a satire (1794) by William Gifford, which, along with the *Maviad* (1795), attacked the insipid and nonsensical poetry of the Della Crusicans.

**Bawbee**, a small Scotch coin, first issued in 1542, in value about three halfpence. The name is now applied in Scotland to the English halfpenny. When used in the plural it expresses money in general.

**Bawian**, or **Bavean**, a populous island of Indonesia. It produces rice; p. 33,000.

**Baxar**, or **Buxar**, municipal town, Bengal, India. It is esteemed a sacred place; p. 50,000.

**Baxter, James Phinney** (1831-1921), American historian, was born in Gorham, Me. He was known chiefly as a writer on early New England history, among his numerous publications being *The Trelawney Papers* (1884); *George Cleve and His Times* (1885); and *The British Invasion from the North* (1887). He also edited 24 volumes of the *Documentary History of Maine*.

**Baxter, Richard** (1615-91), English non-conformist divine, was a native of Shropshire. His famous work, *The Saints' Everlasting Rest*, was published in 1650. He was an able, earnest, and eloquent writer and preacher. Among his writings may be mentioned *The Reformed Pastor* (1656), *Call to the Unconverted* (1657), and *Now or Never* (1663). Consult *Lives* by Bishop Hall, Calamy, Orme, Boyle, and Davies.

**Baxterians**, a name applied to the followers of Richard Baxter, prominent among whom were Isaac Watts and Philip Doddridge.

**Bay** (French *bais*, 'berry'), a name originally applied to the fruit of certain plants, and then to the plants themselves. The Sweet Bay Tree (*Laurus nobilis*) of Southern Europe is the true laurel of the Romans, the *Daphne* of the Greeks, the victor's laurel and poet's laurel of romance. The long-pointed, lance-shaped leaves have many culinary uses, on account

of their aromatic properties; but as they contain prussic acid, they must be used with care.

**Bayaderes**, a name given by Europeans to a class of women in India who follow the profession of dancing. (See NAUTCH GIRLS.)

**Bayamon**, a town of Porto Rico, in the province of San Juan. Nearby are the ruins of the oldest Spanish settlement in Porto Rico. p. 20,245.



Sweet Bay or Laurel. Leaves

**Bayard**, the name of several famous horses of legend and story. The name has come to be applied to any swift and spirited horse.

**Bayard, Pierre du Terrail, Chevalier de** (1476-1524), 'the knight without fear and without reproach,' was the most chivalrous hero of the middle ages. His *Life*, written by his 'loyal servant,' Jacques de Mailles (1489-1524), was translated into English, by Sara Coleridge, Kindersley, and L. Larchey.

**Bayard, Thomas Francis** (1828-98), American statesman, was born in Wilmington, Del. He was the first American to bear the official title of Ambassador to Great Britain. Consult Spencer's *Public Life and Services of Thomas F. Bayard*.

**Bayberry, Candleberry, or Wax Myrtle** (*Myrica*), a genus of hardy shrubs belonging to the family Myricaceae. The bark is astringent and is used medicinally and for tanning. *M. carolinensis*, also known as the waxberry, is the best known species. The bark and leaves, when crushed, are delightfully aromatic. The

fruit or berries are covered with a coating of greenish wax, which is often collected by boiling the berries, and made into candles which give a pleasant odor while burning. A scented soap is also made from bayberry tallow. *M. rubra* is found in Japan and China and is cultivated for its fruit. *M. acris* grows in the West Indies and is the source of bay rum, which is used as a perfume and a cosmetic.

**Bayer, Johann** (1572-1625), German astronomer, was a native of Bavaria. His *Uranometria* (1603), was at that date the most complete chart of the heavens. It was he who introduced Greek and Roman letters into astronomical nomenclature.

**Bayeux**, (anc. *Bajocasses*), town and episcopal see, France, in the department of Calvados. The Cathedral of Bayeux, with parts dating from the 11th century, is one of the most beautiful buildings of Normandy. The

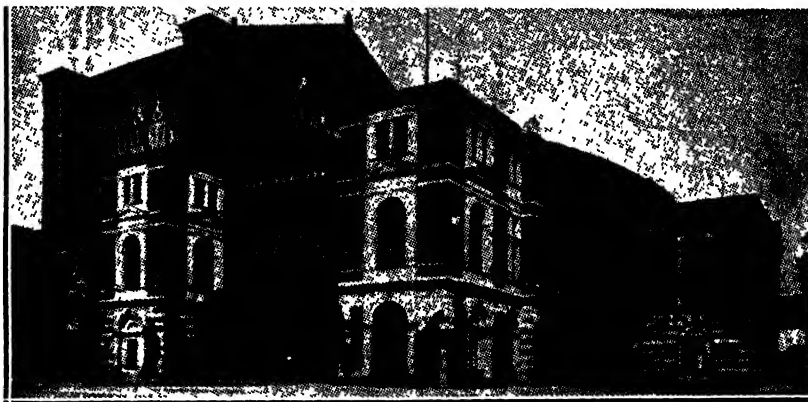
**Bayley, James Roosevelt** (1814-77), American Roman Catholic prelate, was born in New York City. He published *A Sketch of the History of the Catholic Church on the Island of New York* (1853), and other works.

**Bayley, Richard** (1745-1801), American physician, was born in Fairfield, Conn. As health officer of the port of New York he secured the passage of proper quarantine regulations and made valuable investigations as to the nature of yellow fever.

**Baylor, Robert Emmett Bledsoe** (1793-1874), American jurist, was born in Lincoln co., Kentucky. Baylor University is named in his honor.

**Baylor University**, a co-educational institution under Baptist control at Waco and Dallas, Texas, founded in 1845. For recent statistics, see **UNIVERSITY**.

**Baynes, Thomas Spencer** (1823-87), Eng-



Wagner's Theatre, Bayreuth.

small museum in the public library contains the celebrated Bayeux tapestry; p. 10,246.

**Bayeux Tapestry**, an ancient piece of embroidery preserved in the public library in Bayeux, France, depicting the conquest of England by William the Conqueror.

Its value as a record of the costumes, manners, and history of the time is enormous, and its discovery due to Bernard de Montfaucon, who published representations of it in his *Monuments de la Monarchie Francaise* (1729-33). Consult F. R. Fowke's *The Bayeux Tapestry*; Belloc's *The Book of the Bayeux Tapestry* (1914).

**Bay Islands**, a group in the Bay of Honduras, ceded by Great Britain to Honduras in 1859. The trade is principally in bananas and coconuts; p. 4,000.

lish man of letters, was born in Wellington, Somerset. In 1873 he was appointed editor of the 9th edition of the *Encyclopædia Britannica*, to which he contributed a notable article on *Shakespeare*, reprinted in his volume, *Shakespeare Studies* (1894). Baynes translated the *Port Royal Logic* (1851), and wrote an essay on *The New Analytic of Logical Forms* (1852).

**Bayonet**, a short sword, the blade of which is twelve to fourteen inches long, which fits on to the muzzle of the rifle, and which is given to the foot soldier as a weapon for use in hand-to-hand fighting. The old sword bayonet was considerably longer, was triangular in section, and tapered decidedly towards the point.

**Bayonne**, fortified town and episcopal see

department Basses-Pyrenées, France. It is divided by the rivers into two parts and is connected by bridge with St. Esprit, a separate town until 1857, now a suburb. Features of interest are the Cathedral, a 13th century building with some good stained glass and the citadel; p. 32,620.

**Bayonne**, a city, in Hudson co., New Jersey. It is an important manufacturing city. There are also large coal-shipping interests as well as refining and smelting works, manufactures of chemicals, structural iron, motor boats, paints, silk, and wire; p. 77,203.

**Bayonne Decree**, a decree issued by Napoleon at Bayonne, April 17, 1808, ordering the seizure and condemnation of all American vessels which should enter the ports of France, Spain, Italy or the Hanse towns.

**Bayou**, a name applied in the Southern United States to a stream or canal connecting other streams or rivers, and not fed by natural springs.

**Bayou State**, popular name for Mississippi.

**Bay Psalm Book**, the earliest version of the Psalms printed and published in New England (Cambridge, 1640), and the first book printed in the English colonies in America. It was produced by Richard Mather, Thomas Welde, and John Eliot, and was printed by Stephen Daye.

**Bayreuth**, or **Baireuth**, town, Bavaria, district of Upper Franconia. It is especially celebrated for its Festival Theater, built through the efforts of Wagner; p. 33,128.

**Bay Rum**. See **Bayberry**.

**Bay State**, popular name for the State of Massachusetts (q.v.).

**Bay Window**, a term used for a window which projects beyond the line of the front of a house, generally constructed in the form either of a semi-hexagon or a semi-octagon, and first used generally in late Gothic architecture.

**Bazaar**, a Persian word designating a market-place, where people also gather together to hear the news and discuss politics.

**Bazigars**, a nomadic tribe scattered over India, mostly Mohammedan.

**Bdellium**, a name given to several myrrh-like gum-resins of various origin, formerly used in pharmaceutical practice.

**Beach, Moses Yale** (1800-68), American inventor and publisher, was born in Wallingford, Conn. Having gone to New York City in 1835, he acquired an interest in and later became sole proprietor of the New York *Sun*.

**Beach, Rex (Ellingwood)** (1877-1949), American author, was born in Atwood, Mich.,

studied law in Chicago, but devoted himself to writing novels of adventure. Perhaps his best known novel was *The Spoilers* (1905).

**Beaches, Raised**, horizontal terraces of varying width, some distance above the present seashore, which were evidently beaches at some earlier time.

**Beach Fleas**, minute amphipod crustaceans which dwell between tide-marks, and congregate in the rows of damp sea-wrack which lie just above the surf-line on most beaches.

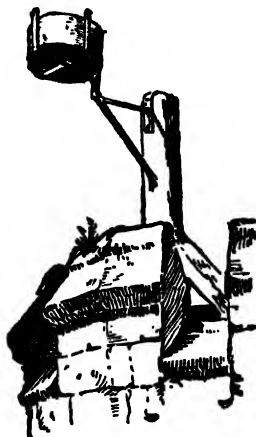
**Beach Grass**. See *Ammophila*.

**Beach Pea**. See *Lathyrus*.

**Beach Plum** (*Prunus maritima*), a species of plum found on the eastern beaches of the United States.

**Beachy Head**, cape on the southern coast of Sussex, England. The Battle of Beachy Head, in which an Anglo-Dutch fleet under Admiral Arthur, Earl of Torrington, was defeated by a French fleet under Comte de Tourville, was fought near this point, June 30, 1690.

**Beacon**, a signal or indicator. In the tenth century Anglo-Saxon poem of Beowulf, 'beacon' is used with the meaning of 'ensign' or 'standard'; but by the 14th century it had begun to



*Ancient Beacon*

develop its more special meaning of 'fire-signal.' It was probably an outgrowth of the fire basket which was carried by watchmen and servants at the tops of poles and fixed on inner walls or suspended from vaulted roofs, for the purpose of illumination, and also placed at outer ends of harbor walls to guide incoming boats at night. For beacons in the modern sense of marks for navigation on coasts, in rivers, and in harbors or bays, see **BUOY**.

**Beacon Hill**, a hill in Boston, Mass., near

the Common, on which stands the State House. On this hill, in early colonial times, a beacon signalled the approach of hostile Indians.

**Beaconsfield**, market town and parish, England, in Buckinghamshire. Edmund Burke lived here, and is buried in the parish church; p. 3,642.

**Beaconsfield, Benjamin Disraeli**, Earl of (1804-81), English statesman and novelist, the second of the four children of Isaac Disraeli, was born in London. At the age of twenty-one he published his first (semi-autobiographical) novel, *Vivian Grey*, which proved the book of the season. He followed this with three brilliant satires—*Ision in Heaven*, *The Infernal Marriage*, and *Popanilla*. *The Revolutionary Epic*, published in 1834, proved to him that he was not a poet, and he decided to enter politics.

Affecting extreme foppiness in dress, he started as a Radical, attempted to enter Parliament from High Wycombe, and was rejected. As a Tory candidate for Taunton he came into collision with O'Connell, and more notoriety was the result. The London Times published his *Letters of Runnymede*, attacking the Whig leaders; and to the 1837 Parliament he was easily returned for Maidstone, as the colleague of Wyndham Lewis, whose widow he married in the following year.

In 1841 he took his seat for Shrewsbury, which in 1847 he exchanged for Buckinghamshire. Having associated himself with some of the younger Tories—Young England—Disraeli had meantime written several more novels, embodying the views of this group on the salvation of England by the aristocracy. *Henrietta Temple* and *Venetia* (1837) were followed by the political *Coningsby* (1844), *Sybil* (1845), and *Tancred* (1847). When Peel abandoned protection in 1846, Disraeli, by a series of fierce attacks on his old chief, made himself the leader of the Tories. For a quarter of a century he led the Conservatives in the House of Commons, 'educating,' in his own phrase, the men who slowly and reluctantly submitted to his indispensable dominance. He was three times Chancellor of the Exchequer (1852, 1858-9, and 1866), and was prime minister in 1868 and 1874-80. The Reform Act of 1867 was chiefly due to his influence. In 1876 he made Queen Victoria Empress of India, bought the Suez Canal shares, and became Earl of Beaconsfield; and in 1878 he loosened the grasp of Russia on the throat of Turkey, and brought back 'peace with honor' from the Berlin Congress. His greatest novel, *Lothair*, was published in 1870; his last, *Endymion*, in 1880.

He was buried at Hughenden, leaving directions that his *Life* should be written by Lord Rowton. Consult Money Penny, W. F., and Buckle, G. E., *Life of Benjamin Disraeli, Earl of Beaconsfield*. 2 vols. (rev. ed. 1929; Mauris, Andre, *Disraeli* (repr. 1942); Pearson, Hesketh, *Dizzy* (1951).

**Beadle**, a functionary, bearing a mace or a wand of office, who precedes civic or ecclesiastical dignitaries.

**Beads**, a variety of personal ornament. Beads were among the earliest ornaments: they have been found in Egyptian tombs; glass beads, used by the Phoenicians for trade, are still treasured by African chiefs.

**Beagle**, in appearance a miniature foxhound, is the smallest dog used for hunting purposes. It would appear to be of ancient origin, for a pair are mentioned at the time of Queen Elizabeth. The present-day beagle varies in height from 10 to 16 in. It possesses an extraordinary keen scent, acute intelligence, and admirable perseverance.



*Beagle.*

**Beagle**, the British sloop on which Charles Darwin, as naturalist, made his famous voyage (1831-6).

**Beak**, in birds. See **Bill**.

**Beaker**, a thin cylindrical or conical vessel made of glass, used in chemical operations to heat liquids, collect precipitates, etc.

**Bearn**, *White (Pyrus aria)*, a tree about 30 ft. high, belonging to the pear genus of Rosaceae which is found in Europe and Asia. The wood is yellowish white, hard, close-grained, and takes on a high polish; it is very suitable for turning.

**Beam**. See **Shipbuilding**; **Building**.

**Bean**. A name properly given to the kidney-shaped seed of certain leguminous plants. The bean of earliest agricultural importance is the horse, tick, or broad bean, *Vicia faba*. This bean is largely grown in Europe both in the

field as a stock food, and in the garden as a table vegetable.

The bean commonly grown in the United States and Canada is of American origin and belongs to the genus *Phaseolus*. The common



Benjamin Disraeli, Earl of Beaconsfield, 1867.  
(Portrait in possession of Maj. Coningsby Disraeli.)

kidney bean or haricot, *P. vulgaris*, comprises the field and the garden string or snap beans, both dwarf and climbing.

Of the climbing types of beans the Limas, *P. lunatus*, are most popular. The scarlet runner bean, *P. multiflorus*, is used primarily as



Lima Bean (*Phaseolus lunatus*).

an ornamental vine, though the seeds are edible as shelled beans.

Kidney, lima, and scarlet runner beans are all very sensitive to frost and can be planted

only after settled weather comes in spring. For planting information, consult *Price List 44, Plants*, issued by Supt. of Documents, U. S. Printing Office, Washington, D. C.

**Bean Tree**, a name given to various trees because of the similarity of their fruit to a bean. In the United States and West Indies there are four or five species so named, of which the best known are the *Catalpa bignonioides*, more usually known as Indian-bean tree, and the Jamaican *Erythrina corallodendron*. In Australia, the Moreton Bay chestnut, *Castanospermum australe*, is called the bean tree.

**Bears** form a well defined group (family Ursidae) of carnivores most nearly related to the canine branch, both the dogs and the bears tracing their ancestry to the same source (Amphicyon) in the Miocene Age. The development of the group was very slow, however, and bears may be considered the most modern of the Carnivora. Their big, clumsy looking forms, coarse, shaggy coats, short tail, and plantigrade, naked-soled feet (a primitive relic), giving them a comparatively slow and awkward gait, make all bears externally peculiar and easily recognizable at a glance.

Broadly speaking, the kinds fairly distinct are these: Polar or ice bear (*Ursus maritimus*) a denizen of the Arctic regions; the brown bear (*U. arctos*) which ranges throughout northern Europe and Asia (except Japan), and exhibits many varieties. Allied to them are the broad-headed brown or hoary grizzly bears of western America (*U. horribilis*), with which should perhaps be included the Barren-Grounds bears, and which range from Arizona to Alaska. Distinct from these are the American black bears (*U. americanus*), originally distributed over nearly all the forested area of North America. South America has a single species which naturalists place in a separate genus as *Tremarctos ornatus*. In the Himalayan region, northern China and Japan, are found the Asian black bears (*U. tibetanus*). Tibet also has another supposedly distinct species in the partly-colored bear (*U. pruinosus*). In the Malayan islands occurs the quaint little arboreal sun bear (*U. malayanus*); and in the St. Elias Alps of Alaska the glacier bear (*U. middendorffi*). Lastly is to be mentioned the very distinct sloth or honey bear (*Melursus labialis*) of India and Ceylon.

In general habits bears (excepting the white polar species) are much alike. Most of them are adepts at climbing. This formidable animal, a nocturnal prowler in dark forests and calling for the greatest prowess in its con-

queror, naturally appealed to the imaginations of primitive peoples, and has figured largely since prehistoric times in fables and folk-lore.

See Mills, E. A., *The Grizzly; Our Greatest Wild Animal* (1919); Roosevelt, Leila, and Westley, William, *The Pet Parade* (1954).

**Bear-Baiting.** The baiting of bears with dogs was a favorite sport of the Romans, who imported bears from Britain, Syria, and elsewhere for the purpose.

**Bearberry** (*Arctostaphylos*), a genus of the heath order (Ericaceae), found chiefly in America. *A. uva-ursi* is common in sandy soils. In some regions it is eaten by bears and birds.



Bearberry (*Arctostaphylos uva-ursi*).

Stamen, section of ovary, and cluster of fruit.

**Beard.** See Hair.

**Beard, Charles Austin** (1874-1948) American historian and political scientist born near Knightstown, Ind., and educated at DePauw Univ. He taught politics at Columbia Univ. (1907-17), and was director, Training School for Public Service (1917-22). His many works include those written with his wife: *The Rise of American Civilization* (1927); *America in Midpassage* (1939); *The American Spirit* (1942); *A Basic History of the United States* (1944); others include *The Discussion of Human Affairs* (1936); *The Republic* (1943); *American Foreign Policy* (1946).

**Beard, Daniel Carter** (1850-1941) American illustrator and author of popular boys' books on woodcraft, camp-lore, etc. He founded the Boy Scouts of America.

**Beard, George Miller** (1839-83), American physician, born in Montville, Conn. He was one of the first to make use of electricity as a tonic in nervous diseases and in the treatment of diseases of the skin. His works treat of *American Nervousness* (1881), *The Study*

of *Trance* (1882), and *Nervous Exhaustion* (1890).

**Beard Moss**, a lichen (*Usnea barbata*) which hangs like tangled tresses of hair from the branches of trees in various countries of the temperate regions.

**Beardsley, Aubrey Vincent** (1872-98), English artist, was born in 1872 at Brighton. His work had much influence on contemporary art in general.

**Bearing.** To builders the bearing of a piece of timber means the unsupported part between two fixed extremities or supports, which are likewise called bearings. The term is also applied to the distance or length of the beam beyond the line or face of support. In applied mechanics a bearing is the support of a moving part of a machine. Bearings have a double part to play: they not only furnish a support, but permit the part of the machine supported to perform the motion or motions required of it. (See FRICTION; BALL BEARINGS.) In nautical language, bearing connotes the position of any object with regard to the observer's ship as determined by compass. while in surveying the direction of a given line with respect to the meridian or other determined line is also known by this term.

**Bear Island**, one of the Spitsbergen (or Svalbard) Archipelago.

**Beas** (the *Hyphasis* of the Greeks; Sans *Vipasa*), one of the five rivers of the Punjab, India.

**Beat**, in music. (1) A name formerly given to certain graces or ornaments. (2) The wavy effect produced when two notes, which are nearly but not quite in unison, are sounded simultaneously.

**Beaton, David, Cardinal** (1494-1546), primate of Scotland. He was assassinated at St. Andrews on May 29, 1546. See Burton's *History of Scotland*; Knox's *History*; the *Inconographia Scotica*; G. Cook's *History of the Reformation in Scotland* (2nd ed. 1819).

**Beatrice**, the angelic woman who was the heroine of Dante's *Vita Nuova*, of his *Divina Commedia*, and of his whole life. She was a Florentine lady, named Bice Portinari, who married Simone de' Bardi. She died 1290.

**Beatrice, Princess** (1857-1944), youngest daughter of Queen Victoria; married Prince Henry of Battenberg (the name was changed to Mountbatten in 1917).

**Beattie, James** (1735-1803), Scottish poet and writer. In 1771 he published the first book of *The Minstrel, or the Progress of Genius*, the work on which his fame rests.



Consult his *Life* by Sir W. Forbes and the edition of his poems by Alexander Dyce for the Aldine Series.

**Beatty, David, 1st Earl,** (1871-1936), British admiral, was born in Borodale, Wexford co., Ireland. He was in command of the Grand Fleet in 1916-19, and became First Sea Lord in 1919. He participated in the Battle of Jutland (see JUTLAND BANK, BATTLE OF), May 31 to June 1, 1916; and received the surrender of the German fleet in the Forth, November, 1918. He was one of the British representatives at the Disarmament Conference in Washington, November, 1921.

**Beaufort, Henry** (1377-1447), English cardinal, natural son of John of Gaunt by Catherine, widow of Sir Hugh Swynford. He was thrice chancellor. In 1431 he conducted the young king, Henry VI., to France, to be crowned in Paris as king of France and England.

**Beauharnais, Alexandre Vicomte de** (1760-94), French general, father of the Marquis de Beauharnais, was born in Martinique. After serving under Rochambeau in the American Revolution, he returned to France, embraced republican principles, and was one of the first nobles to join the Third Estate.

**Beauharnais, Eugène, Marquis de** (1781-1824), better known as Prince Eugene, the son of Alexandre Beauharnais and Josephine, afterward consort of Napoleon, was born in Paris. During the war with Austria, in 1809, he was commander-in-chief of the army of Italy, and shared in the honors of Wagram. In the later wars of Napoleon he took an active share, especially in the campaigns of 1812-13. Consult Baron Darnay's *Notices Historiques sur . . . le Prince Eugene*; Du Casse's *Memoires et Correspondence du Prince Eugene*.

**Beaumarchais, de, Pierre Augustin Caronde** (1732-99), French dramatist and politician, was born in Paris, Pierre Augustin Caron. His first plays, *Eugenie* (1767) and *Les Deux Amis* (1770), were not successful. The two famous comedies, *Le Barbier de Seville* (1772) and *Le Mariage de Figaro* (1776), which, produced in 1784, met with an unprecedented success. Consult Lemaitre, Georges, *Beaumarchais* (1949).

**Beaune**, town, department of Côte d'Or, France. It is celebrated for the wines of the district, and gives its name to a well-known Burgundy; p. 11,900.

**Beaumont, Francis** (1584-1616), English dramatist, son of Francis Beaumont, a judge,

and younger brother of Sir John Beaumont, was born in Grace-Dieu, Leicestershire. He first appeared as a poet in 1602, although it is not clear that the ascription to him of the Ovidian narrative poem *Salmacis and Herma-phrodite*, is correct. His close literary and personal relation with John Fletcher began about 1607, and he probably had a share, often a large one, in about half a dozen of the plays generally included in editions of Beaumont and Fletcher. For a classification of the plays credited to Beaumont and Fletcher, on the basis of authorship, see FLETCHER, JOHN. Consult Thorndike, A. H., *English Comedy* (1929); *Beaumont and Fletcher*, ed. by J. St. Loe Strachey. 2 vols. (repr. 1949-50).

**Beaumont, Sir George Howland** (1753-1827), English connoisseur, patron of art and landscape painter. The formation of the National Gallery is largely owing to his efforts, and to it in 1826 he presented sixteen pictures from his own collection.

**Beaumont, William** (1785-1853), American physician, was born in Lebanon, Conn. When stationed at Mackinac, Mich., 1822, he had under his treatment Alexis St. Martin, who had received a shot wound in the stomach. The patient recovered, but an orifice in the stomach remained open, so that the doctor was enabled to observe the processes of digestion and to obtain the first specimen of human gastric juice ever examined. His observations, published in 1833, soon became recognized as one of the classics of physiology.

**Beaumontague**, is a composition of iron borings, brimstone, pitch, sal-ammoniac, rosin, and beeswax, used to fill up cracks and flaws in an iron casting.

**Beauregard, Pierre Gustave Toutant** (1818-93), Confederate general, was born in New Orleans. He became a brigadier-general in the Confederate army, and was entrusted with the defence of Charleston, in which capacity he bombarded and forced the surrender of Fort Sumter. He commanded the Confederates in the battle of Bull Run (July 21, 1861), where he defeated General McDowell, and was raised to the rank of general. At Shiloh he took command upon the death of General A. S. Johnson (April, 1862). He was the author of *Principles and Maxims of the Art of War* (1863), and *Report of the Defence of Charleston* (1864). Consult Roman's *Military Operations of General Beauregard*.

**Beauvais**, capital of the department of Oise, France. The lofty cathedral of St. Pierre begun in 1247, and never completed, is one of

the finest examples of Gothic architecture in France. The tapestry factory, founded in 1664, belongs to the State; p. 19,841.

**Beaux, Cecilia** (1863-1942), American artist, was born in Philadelphia, Pa. Her portraits are among the finest in American painting, and her honors were many.

**Beaver** (*Castor fiber*), a large rodent of which there are two species or varieties, one occurring in Northern and Eastern Europe and in Northern and Western Asia, and the other in nearly all parts of North America. The two species are so similar that by many naturalists the American beaver is considered merely a variety of the European species. The animal is from two to two and a half ft. long, exclusive of the tail, and has short, soft, thick fur of a reddish-brown color which has great commercial value.

The great interest in the beavers lies in the ingenuity which they manifest in the construction of their houses or 'lodges,' and in the building of dams where the water in the vicinity of their dwellings tends to become so shallow as to impede their movements. The diet consists of the leaves and bark of trees, especially willow and poplar, and it is these trees which are by preference used in building. Consult Martin's *Castorologia*; Morgan's *American Beaver*; Mills' *In Beaver World*; Hornaday's *American Natural History*.

**Beaverbrook, 1st Baron** (Aitkin, William Maxwell), (1879- ), capitalist, political leader, and newspaperman of Canada. His first important work was the amalgamation of all Canadian cement mills, which, though much criticized, proved to be a financially sound trust. Having made a fortune he entered Parliament and was associated with Bonar Law. He took an active part in World War I then took charge of several London newspapers. In 1940 he became minister of aircraft production and entered the war cabinet; retired 1942, but was recalled 1943-1945.

**Beaver Islands**, a group of islands, named for the largest, in Lake Michigan, Manitou co., Michigan.

**Beaver State**, popular name of Oregon.

**Beaver Tree**, a name sometimes applied to the sweet bay or swamp magnolia. See MAGNOLIA.

**Bec Abbey**, in the department of Eure, Normandy. A Benedictine abbey founded by Hellouin in 1034, became one of the most noted seats of learning in the west of Europe in the 11th century. Lanfranc and Anselm were both priors here.

**Beccaria, Cesare Bonesana, Marquis de**

(1735-93), Italian jurist and economist, was born in Milan. His first published work was an essay on the coinage of Milan, in 1762; but the work on which his fame rests is the *Treatise on Crimes and Punishments*, which appeared in 1764.

**Beche de Mer**, (Port.), or **Trepang** (Malay), known also as the SEA CUCUMBER, a holothurian or sea slug, much used, when dried, as an article of food in China.

**Becher, Johann Joachim** (1635-82), chemist, was born in Spire, Germany. His *Physica Subterranea* (1669) was the first attempt made to bring physics and chemistry into close relation. In this and his other work (including *Institutiones Chemicae*, 1662) lies the first germ of Stahl's phlogistic theory.

**Bechuanaland**, or the land of the Bechuanas, a region lying north of the Cape of Good Hope in the south of Africa, and including British Bechuanaland and the Bechuanaland Protectorate.

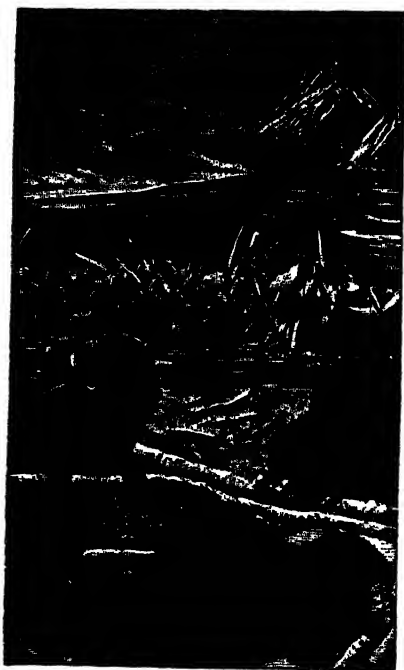
British Bechuanaland extends north to the Molopo River. It was annexed by Great Britain in 1885 and in 1895 was transferred to Cape Colony; p. 99,553.

Bechuanaland Protectorate extends from British Bechuanaland northward to the Zambesi River and from Matabeleland and the Transvaal on the east, westward to Southwest Africa. The natives are engaged chiefly in cattle breeding and farming. The Kalahari Desert (see KALAHARI) lies partially within Bechuanaland; p. 294,000; area 294,020 sq. m.

**Becket, or a Becket, Thomas** (1118-70), Archbishop of Canterbury, was born in London. After receiving a varied training in law and theology, he entered (about 1142) the service of Theobald, Archbishop of Canterbury. He early showed zeal on behalf of Henry of Anjou, who in 1155, appointed Becket his chancellor. In this position he lived sumptuously, and maintained an establishment which outshone that of the king. In 1162 Henry II. took the momentous step of having Becket created Archbishop of Canterbury. He was now as ascetic as he had formerly been luxurious; and he became the champion of the rights of the church. Becket retired for a time to France, but maintained his indomitable antagonism to the king, and continued to champion popular rights and ecclesiastical privileges until his assassination by four of Henry's knights while at the altar, Dec. 29, 1170. In 1220 Becket's bones were enshrined in a chapel of the cathedral, where they long formed a favorite object of pilgrimage, as described in Chaucer's *Canterbury Tales* (1383). See the

*Lives of Becket* by Canon Morris and Canon Robertson; Hook's *Lives of the Archbishop*.

**Beckford, William** (1759-1844), author of *Vathek*, was born at Fonthill, Wiltshire. His famous Oriental romance *Vathek* was published in French in 1782, and an English version surreptitiously in London (in 1784) by Beckford's friend, Rev. S. Henley. In 1796 he retired to Fonthill where he squandered his fortune in extravagant building operations.



*Beavers constructing a Dam.*

**Becque, Henri François** (1837-99), French dramatist, was a Parisian by birth. His earliest dramatic effort was an operatic libretto, *Sardanapale*, in 1867. During the next year his first play, *L'Enfant Prodigue*, was produced, and met with some success, owing to the vigor of its dialogue. He followed this with *Les Honnêtes Femmes* in 1880, and *Les Corbeaux* in 1882. The latter play met with a stormy reception, and was severely criticised for its uncompromising realism. His *Theatre Complet* appeared in 1898.

**Becquerel, Antoine César** (1788-1878), French physicist, was born at Chatillon-sur-Loing. He made important discoveries in the electric conductivity of metals, in magnetism, and in electro-chemistry. His son, ALEXANDRE

EDMOND (1820-91), worked in collaboration with his father. His principal work, dealing with the theory of light, is *La Lumière: ses Causes et ses Effets* (1867-8).—His son, ANTOINE HENRI (1852-1908), followed in the footsteps of his father and grandfather; became an engineer; and was best known as the discoverer of the emanations from phosphorescent and fluorescent substances subsequently known as Becquerel rays.

**Bed.** Originally a bed was the skin of an animal laid on the floor, and afterward it consisted of bags filled with rushes, leaves, or straw. We have very full information relative to the beds and bedding in use by the Romans. In the earlier times they had beds of the same kind as those used by the Greeks. They borrowed from Asia those larger carved bedsteads, gilt and plated with ivory, whereon were piled cushions of wool and feathers, with counterpanes of furs and other rich materials. The Roman customs were handed down to the Gauls and to the Franks. In the reign of Henry III. we find a bed of rather modern appearance, with a tester and curtains. In the 15th century large square-post bedsteads came into fashion in England. Another common bed of the period was the truckle or trundle bed. This was a double bed, a smaller bed running underneath the larger one, which was drawn out for use at night. In the English universities the master of arts had his pupil to sleep in his truckle bed, and at an earlier period it was the place of the *valet de chambre*. The Great Bed of Ware, referred to by Shakespeare, and now in Rye House, is a bed twelve ft. square, and capable of accommodating a dozen sleepers. It is assigned by tradition to Warwick the kingmaker. With the decline of massive furniture the dimensions of the bed were gradually reduced, and this was accompanied by simplicity of design.

**Bed, Geological.** One or more layers of a stratified sedimentary rock possessing a homogeneous character. See STRATUM.

**Bed-bug,** a small, repulsive, ill-smelling, reddish bug (*Cimex lectularius*), one of a group of plant and animal sucking 'cone-nosed' bugs, some of which are large and formidable. It is probably a native of the Orient, but has for centuries been known as a human parasite, and a pest in houses all over the civilized world, especially about beds, where it will multiply swiftly if neglected. See U.S. Gov't publication *Bed Bugs, How to Control Them*.

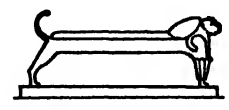
**Beddard, Frank Evers** (1858-1925), English zoologist and biologist.

**Beddoes, Thomas Lovell** (1803-49), Eng-

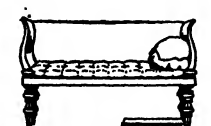
lish poet, first attracted attention by the publication of *The Bride's Tragedy* (1822). His principal work, *Death's Jest-book, or the Fool's Tragedy*, was published (1850) by his friend T. F. Kelsall.

**Bede, or Bæda, The Venerable** (c. 673-735), 'a servant of God, and priest of the

works he gathered together all the world then knew of physics, music, philosophy, grammar, rhetoric, arithmetic, medicine. His great work is the *Historia Ecclesiastica Gentis Anglorum*. For Bede's complete works, see Dr. Giles's edition in 12 vols. (1843-4). The standard edition of the Latin text is Plummer's (1896).



Egyptian.



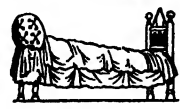
Greek and Roman



Anglo-Saxon



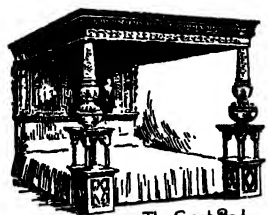
Anglo-Saxon



Norman

Medieval.  
(with Hubs)

Medieval.

The Great Bed  
of WareMarie Antoinette's  
Bed  
(Versailles)

A Shute Bedstead

15th Century  
(Hampton Court)

#### Ancient Types of Bed.

monastery of the blessed apostles Peter and Paul, which is at Wearmouth and Jarrow.' The extent of Bede's learning was surpassed only by the nobility of his character; he was also open-minded and liberal to a quite extraordinary degree. His genius was encyclopaedic rather than original. In some forty-five

For life and criticism, see Morley's *Eng. Writers*, vol. ii., and Stopford Brooke's *Eng. Lit. to the Norman Conquest* (1898).

**Bedell, Frederick** (1868), American physicist, professor at Cornell of applied electricity, in which department he conducted valuable investigations as to alternating currents.

**Bedford.** (1) Parl. and munic. bor. and market town, Bedfordshire, England, on the Ouse, 48 m. (Midland Ry.) from London; p. 53,065. **ELSTOW** ('Helen's Stow'), vil. 1 m. s. of Bedford, is notable as the birthplace of Bunyan (1628). (2) Vil. and popular summer resort, Halifax co., Nova Scotia, Canada, 10 m. from Halifax; p. c. 1,500. (3) City, Ind., county seat of Lawrence co.; p. 12,562. (4) Borough, Pa., county seat of Bedford co. It has many historic associations, having been settled c. 1756; p. 3,521.

**Bedford, John of Lancaster**, Duke of (1389-1435), 3d son of Henry IV. by his first wife, Mary of Bohun. He was created Duke of Bedford (1414) by his brother, Henry V. After Henry's death, in 1422, he became regent of England; and in the struggle for the French crown which followed the death of Charles VI., he commanded the English army in France, proclaimed Henry VI. a child of nine months, at Paris, and defeated the French at Verneuil (Aug. 17, 1424). The title was also conferred by Henry VII. on his uncle, Jasper Tudor, Earl of Pembroke (c. 1431-95), in October, 1485. On the fall of the Lancastrians in 1470 he fled with his young nephew to Brittany, and returned with him to London in 1485, when Henry was crowned.

**Bedfordshire**, inland co., S. Midlands, England, 36 m. in length by 21 m. broad. Area, 473 sq. m.; p. 311,844.

**Bedivere**, Sir, the earliest knight of Arthur's Round Table, survived the great battle with Mordred, and nursed the king until he was borne away to Avilon.

**Bedlam** (corruption of 'Bethlehem'), Hospital of St. Mary's of Bethlehem at Bishopsgate, London, was originally founded in 1247 as a priory, but afterward used as a lunatic asylum. Since 1815 it has been situated at Lambeth.

**Bedloe's Island**, now officially **LIBERTY ISLAND**, in New York Harbor. On it stands the famous Bartholdi statue of Liberty Enlightening the World, presented by France to the United States in 1884.

**Bedmar**, **Alfonso de Cueva**, **Marquis de** (1572-1655), Spanish diplomatist, was sent in 1607 as ambassador to Venice, where he originated a conspiracy for the subjugation of the republic. His conspiracy forms the subject of Otway's play, *Venice Preserved* (1682).

**Bed of Justice** (*Fr. lit se justice*), properly the cushioned throne on which the French king in parliament sat to enforce the registration of his edicts. The last was held by Louis XVI. (Nov. 19. 1787), at Versailles.

**Bedouins** (from Ar. *badw*, 'desert'; hence 'dwellers in the desert'), nomadic Arabs; at first nomads of the Arabian deserts, in contra distinction to the settlers in towns. Haunting deserts, they have preserved the character, given to them over three thousand years ago of a wild people dwelling in tents, their hands against every man, and every man's hands against them. Each tribe dwells by itself: each village under a sheik; forty to fifty villages under a kadi. Their weapons are the long lance, fire-arms, and the yataghan. Expert horsemen, living in the open, they despise townspeople. Hospitality is with them a religion. Consult Raswan, C. R., *Drinkers of the Wind* (1942).



*Bedstraw.*

A, *Galium aparine*: 1, Flower; 2, Fruit. B, *Galium verum*: 1, Flower.

**Bed-sores** are commonly the result of constant pressure on bony points, when the intervening tissues have lost vitality. The prevention of bed-sores depends upon careful nursing. An invalid who cannot move must be shifted frequently. The skin over any threatened point should be kept clean and dry, and the bedding must never be left damp from perspiration or any other cause.

**Bedstraw** (*Galium*), a genus of the order Rubiaceae. The species are numerous, chiefly

in temperate regions; they are all herbs. A red color is also got from the roots. Cleavers, or goose-grass (*G. aparine*), is the rough trailing herb, and its spherical fruits, roasted and ground, are said (doubtedly) to be an excellent substitute for coffee.

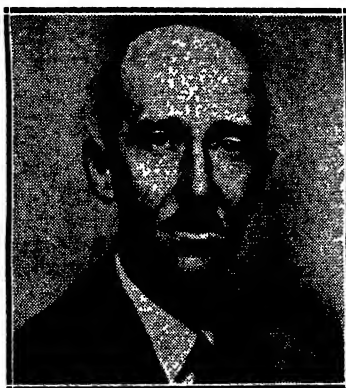
**Beebe, William** (1877- ), American author and scientist, was born in Brooklyn, N. Y. In 1899 he was appointed curator of ornithology, New York Zoological Society. For this organization he collected the living birds which formed the nucleus of the first zoological exhibition of this nation. His extensive travels in Borneo, the region of the Himalayas, and the South Sea Islands are vividly pictured in his writings. Dr. Beebe is best known for his sub-marine explorations in a hollow steel sphere termed 'bathysphere,' specially constructed to withstand great external pressure, fitted with windows, and equipped with searchlight, air conditioning appliances and scientific instruments to enable him to observe marine life at great depths. On August 15, 1934 Dr.

the copper beech and purple beech are best known.



*Beech.*

1, Male flower; 2, Female flower; 3, Fruit.



*William Beebe.*

Beebe descended to a depth of 3028 ft. in the Atlantic Ocean near Bermuda. Among his works are: *Jungle Peace* (1918); *Jungle Days* (1925); *Pleasant Jungles* (1927); *Half Mile Down* (1934); *Book of Naturalists* (1944).

**Beech.** The American beech (*Fagus Americana*) is one of the stateliest of our forest trees. It is large, attaining to a height of more than 100 ft. It is easily propagated by sowing the nuts in March at a depth of one inch in carefully prepared soil.

The European beech (*F. sylvatica*) is also famous. It was honored by the Romans, and is the Danish national tree. There are many varieties of this beech in cultivation. Of these

**Beecher, Catherine Esther** (1800-78), American educator, eldest child of Lyman Beecher, was born at East Hampton, L. I., N. Y. She published several books on domestic and educational subjects, of which the most important was written in collaboration with her sister, Harriet Beecher Stowe, *The American Woman's Home* (1869).

**Beecher, Charles** (1815-1900), American clergyman, 4th son of Lyman Beecher, was born at Litchfield, Conn. He made the musical selections for the *Plymouth Collection of Hymns and Tunes*. He edited the *Autobiography and Correspondence of Lyman Beecher* (1864), and wrote *Pen Pictures of the Bible* (1855), *Spiritual Manifestations* (1879), and *Eden Tableau* (1880).

**Beecher, Charles Emerson** (1856-1904), American geologist, was born at Dunkirk, N. Y. He contributed more than fifty papers to scientific periodical literature. They dealt principally with brachiopoda and trilobites.

**Beecher, Edward** (1803-95), American clergyman and educator, was born at East Hampton, L. I., N. Y. He was an editor of the *Congregationalist*, and wrote for other periodicals. His principal works are *The Conflict of Ages* (1853) and *The Concord of Ages* (1860).

**Beecher, Henry Ward** (1813-87), American clergyman, was born at Litchfield, Conn. In 1847 he accepted a call to the pastorate of Plymouth Congregational Church, Brooklyn, N. Y. Here he gathered around him the large

est congregation in the United States. Mr. Beecher was editor of the *Independent*, 1861-3, and contributed to it for twenty years. He retired as editor of the *Independent* in 1863 and was succeeded by his friend, Theodore Tilton, who later charged Beecher with having had improper relations with Mrs. Tilton. The trial, which lasted for six months, ended in a disagreement, nine of the jury voting in favor of Beecher. The faith of his congregation was undiminished, however, and he retained his pulpit until his death of apoplexy in 1887. See Lyman Abbott's *Henry Ward Beecher*, with a full bibliography (1903); and *Henry Ward Beecher: a Biography*, by W. C. Beecher, Rev. S. Scoville, and Mrs. Beecher (1888); Paxton Hibben's *Henry Ward Beecher* (1927).

**Beecher, Lyman** (1775-1863), American clergyman, was born in New Haven, Conn.

and *Correspondence* was edited by Charles Beecher (1863).

**Beecher, Thomas Kennicutt** (1824-1900), American clergyman, was born at Litchfield, Conn. Among the poorer classes he was known as 'Father Tom.' Author of *Our Seven Churches* (1870).

**Beechey, Frederick William** (1796-1856), English rear-admiral and geographer, son of Sir William Beechey, served under Franklin in the Arctic expedition of 1818, and under Parry in 1819.

**Beechey, Sir William** (1753-1839), English painter, was born at Burford, Oxfordshire.

**Beechey Island**, islet, Arctic Archipelago, so called from Admiral Beechey. Here Franklin's second expedition wintered for two years.

**Bee-eater**, a bird of the picarian family Meropidae, allied to the kingfishers. All the bee-eaters are brilliantly colored. The common migratory bee-eater of Europe (*M. apiaster*) has an extensive range over Asia, Europe, and Africa.



Bee-eater.

**Bee-eater.** (1.) A term popularly applied to some of the retainers of the English royal household, notably to the yeomen of the guard, whose original duties were those of service at the king's table. See YEOMEN OF THE GUARD. (2.) An African bird (*Buphaga africana*) similar to the starling, called also ox-pecker and buffalo-bird.

**Beef Tea**, a light article of diet, commonly used for the sick and convalescent.

**Beefwood**, a name applied to the wood of the bully-tree (*Swartzia*) of the order Leguminosae, and the various species of *Casuarina*. See CASUARINA.

**Beelzebub**, a deity whose shrine was at Ekron, a Philistine town. As the later Jews considered heathen gods to be demons, the New Testament transference of the name to Satan is easily understood. The word is now believed to be a derisive corruption of Baalzebub, 'lord of the high house'—the deity worshipped in a temple. See BAAL.

**Bee Martin.** See KING BIRD.

**Bee Moth.** See HONEYCOMB MOTH.

**Beer.** See BREWING.

**Beerbohm, Max** (1872), British author and



American Beech (*Fagus Americana*) in Winter.

He published an edition of his *Works* (3 vols., 1852). His highly entertaining *Autobiography*

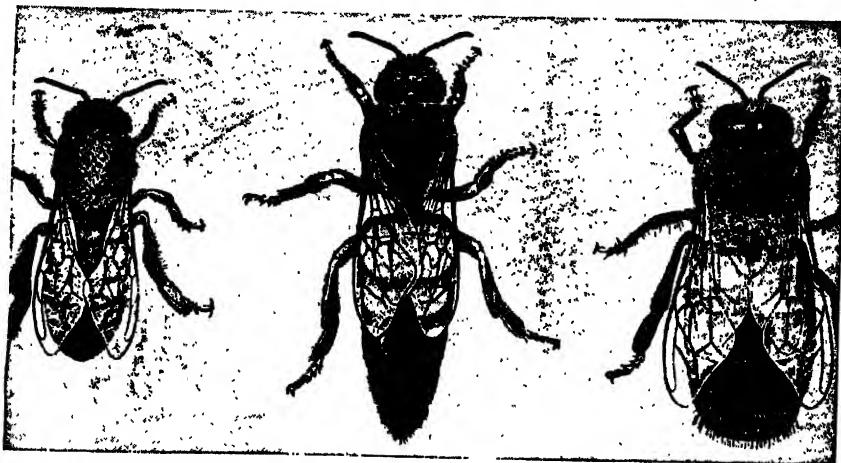
caricaturist, a half-brother of Sir Beerbohm Tree, was born in London. He published *The Works of Max Beerbohm*; *A Christmas Garland*; *The Happy Hypocrite*; *Zuleika Dobson*, his only novel; *Caricatures of Twenty-Five Gentlemen*; and many more.

**Beernaert, Auguste Marie François** (1829-1912), Belgian statesman, was born in

Ostend. He was an ardent advocate of international arbitration and served many times on arbitral tribunals.

**Beeroth**, a city of Benjamin between Jerusalem and Bethel. It has archeological remains of interest; p. 1,000.

**Beers, Henry Augustin** (1847-1926), Amer. educator, born in Buffalo, N. Y. His



Photograph from Underwood and Underwood, N. Y.

*The Honey Bee.* From left to right: Worker, queen, drone.



*Male Bumble Bee.*



books include: *A Century of American Literature* (1878); *From Chaucer to Tennyson* (1890); *Initial Studies in American Letters* (1891); *Selections from the Prose Writings of S. T. Coleridge* (1893); *History of Romanticism in the Eighteenth and Nineteenth Centuries* (1899-1901); *Four Americans: Roosevelt, Hawthorne, Emerson, Whitman* (1919).

**Beersheba**, town, Palestine, the southernmost one belonging to the Israelites. It is closely associated with the history of the patriarchs, and frequent references are made to it throughout the Old Testament narrative.

**Beery, Wallace** (1886-1949), American actor, born in Kansas City, Mo. He was an elephant trainer, film actor, aviator and studio manager. He had leading stage roles and appeared in many screen successes, notably in *Grand Hotel*, *The Champ*, and with Jackie Cooper in *Treasure Island*.

**Bees**, a family of insects belonging to the order Hymenoptera, and to the same suborder as the wasps and ants. Bees are variously classified on the basis of structural differences and on the basis of habit. Structurally there are two great groups—those in which the tongue is a short, flattened, spoon-like organ, and those in which it is long, slender, and flexible. Grouped on the basis of habit, they also fall into two classes, solitary and social.

The social bees include two great families—the Honey Bees (*Apis*) and the Bumble Bees (*Bombina*). These bees live in communities, and, as in the case of ants, various sets of members have come to discharge special functions. The result of this division of labor has been difference of form, or polymorphism. In fact, restricted function has led to the establishment of castes. Thus the ordinary hive contains (1) a single queen bee—the fertile female and mother of the next brood, the males or drones, and the vast majority of workers or imperfectly developed females, which only exceptionally become fertile. Because of its great economic importance, the Common Honey Bee or Hive Bee will be considered in detail.

Like that of other insects, the body of the bee is readily divisible into three portions—head, thorax, and abdomen. The head is well defined from the body, and bears the organs of sight, touch, mastication, and honey-collecting. There are two compound eyes, borne on the sides of the head. Below the eyes are two jointed feelers or antennae, most essential organs of sensation. Next come the horny, toothed mandibles, freely articulated to the

head, and well adapted for cutting the resinous cement or propolis into shapes, and for the finer work of handling the pollen, and the like. The circulatory, respiratory, excretory, and reproductive systems do not differ markedly from those of other insects.

As in the case of the majority of insects, the life-history is divisible into four chapters—the developing egg, the larva or grub, the pupa, and the perfect insect.

It has been already noted that the social life of bees has resulted in some division of labor. At the beginning of spring the hive contains a single queen and a much-reduced contingent of workers. Towards this end the queen lays numerous eggs which develop into workers. After the stock has been thus replenished, eggs are laid which turn out males or drones. After they begin to appear, eggs are laid which develop into more workers, and also into a few queens. The rapid increase of population culminates in the emigration known as *swarming*, when the old queen accompanied by a large contingent of subjects leaves the hive. The date of swarming is markedly affected by the temperature and the food-supply.

A populous stock will often send off three swarms in rapid succession. When the season and necessity for swarming are past, the young queens that remain imprisoned in the royal cells are liberated at once and allowed to fight for the sovereignty. The survivor then takes her nuptial flight.

Mating occurs in the air, followed by the death of the male. The newly impregnated queen thereupon returns to the hive to begin her egg-laying. It is a generally accepted conclusion that the queen mates but once, a single impregnation being sufficient for her lifetime of from two to four years. When swarming time is over, and the supply of honey decreases, the bees commence to rid the hives of the drones, henceforth mere useless consumers.

The queen bees are reared from special eggs, which begin to be laid after the drones appear on the scene. Just as the drones and queens maintain the numbers of the hive so far as reproduction is concerned, so the supplies of food are collected by the myriads of workers. Among these there is some slight division of labor. Members of the community, varying in age and constitution, are told off to special tasks. In the normal colony there may be as many as 20,000 workers to one queen and a few dozen or possibly a few hundred drones.

Bees feed principally on the nectar and pollen of flowers. When the bee proceeds to rob a flower of its nectar, the tongue, folded up



*Courtesy of the United Fruit Company*

**Loading Bananas for Shipment at a South American Plantation**



when at rest, is protruded beyond its ensheathing parts, and is pushed as a probe into the flower-tube. (See HONEY.)

Besides the nectar, the *pollen* of flowers is essential to the normal life of bees; it is the ambrosia of the hive, and is largely used as food for the young. As the nectar is non-nitrogenous, the necessity for some other kind of food is obvious. Drones and queens, however, never eat raw pollen, and must therefore get their nitrogen indirectly.

Bees also collect a resinous strongly adhesive, reddish-brown substance, known as *propolis*. This is obtained chiefly from the resinous exudations of such trees as fir, poplar, alder, birch, willow, horse-chestnut, etc., and is much used by the bees as a cement. With it they varnish the combs, stop up holes, and 'strengthen the outworks of their city.'

The wax used in the construction of the comb is manufactured by the bees themselves. The secretion is exuded from eight wax-pockets situated on the ventral surface of the abdomen. Each comb consists of rows of cells disposed at right angles to the comb. Each cell of this two-sided comb is a hexagonal prism, with its internal apex lying in the depression between three adjacent cells on the opposite side.

Bee culture, also called beekeeping and apiculture, for the production of honey and wax for human use has been carried on for centuries. Apart from the frequent Scriptural mention of bees and honey, and the allusion to bees in the hieroglyphics of ancient Egypt four thousand years ago, Aristotle the philosopher, in the 4th century B.C., and, two hundred years later, Virgil the poet and Pliny the naturalist, all wrote about bees—Virgil's 4th Georgic being in itself a valuable book on bees and beekeeping.

The 17th century was prolific in bee literature, but little additional knowledge was gained, and it was not until Huber, the blind naturalist of Geneva, began his investigations, and in 1793 published his *Nouvelles Observations sur les Abeilles*, that marked progress was made. In 1841 Prokopovitch, a Russian beekeeper, who owned an apiary of 2,800 colonies of bees, made the first known attempt at constructing a hive with an upper chamber for surplus honey, and frames of combs that were capable of being removed. The introduction of the methods of modern beekeeping may, however, be said to date from the invention (1851) of the movable frame by the Rev. L. L. Langstroth, an American clergyman, who made perfect the frame devised by the Russian

apiarist. The next important advance was made by the introduction of what is known as comb foundation—thin sheets of beeswax, which, on being passed between embossed metal rollers, have impressed on their surface the outline of the cell base of natural comb. These sheets, when fitted in frames, ensure perfectly straight combs, and are readily adopted by bees as their own handiwork, thus effecting an enormous saving to them in labor and material. Other inventions tending to increase the production of honey and render the management of bees more easy have followed upon these, and to-day bee culture constitutes a profitable minor industry in the United States and elsewhere.

In securing the honey and in any other necessary manipulations, the bees should be handled so that they will be disturbed as little as possible in their work, and with proper precautions against stinging. The use of a good 'smoker' in the form of a miniature bellows in which a piece of cotton is kept smouldering is advisable.

The question as to the race and strain of bees to be kept is an important one. The most popular race in the United States is the Italian, introduced from Northern Italy. Other varieties are the Black or German Bees, the Caucasians, Carniolans, Cyprians, and Syrians.

The control of swarming is a very important feature of bee raising. When a swarm issues from the hive it commonly settles on the limb of a nearby tree or bush. This may be sawed off and the bees may be carried on it to the hive or they may be shaken off into a box or basket and hived. To avoid the necessity of watching for swarms and the chance of eventually losing them, methods of *artificial swarming* are now practised by all advanced beekeepers.

On the adult bee lice are common pests, while the larvae of the ichneumon do great damage to the grubs. Honey-bees, however, are apparently exempt from the attacks of the latter. The most common diseases to be guarded against are Bee Paralysis and Dysentery, which attack the adult bees, and American and European Foul Brood, which destroy the larvae.

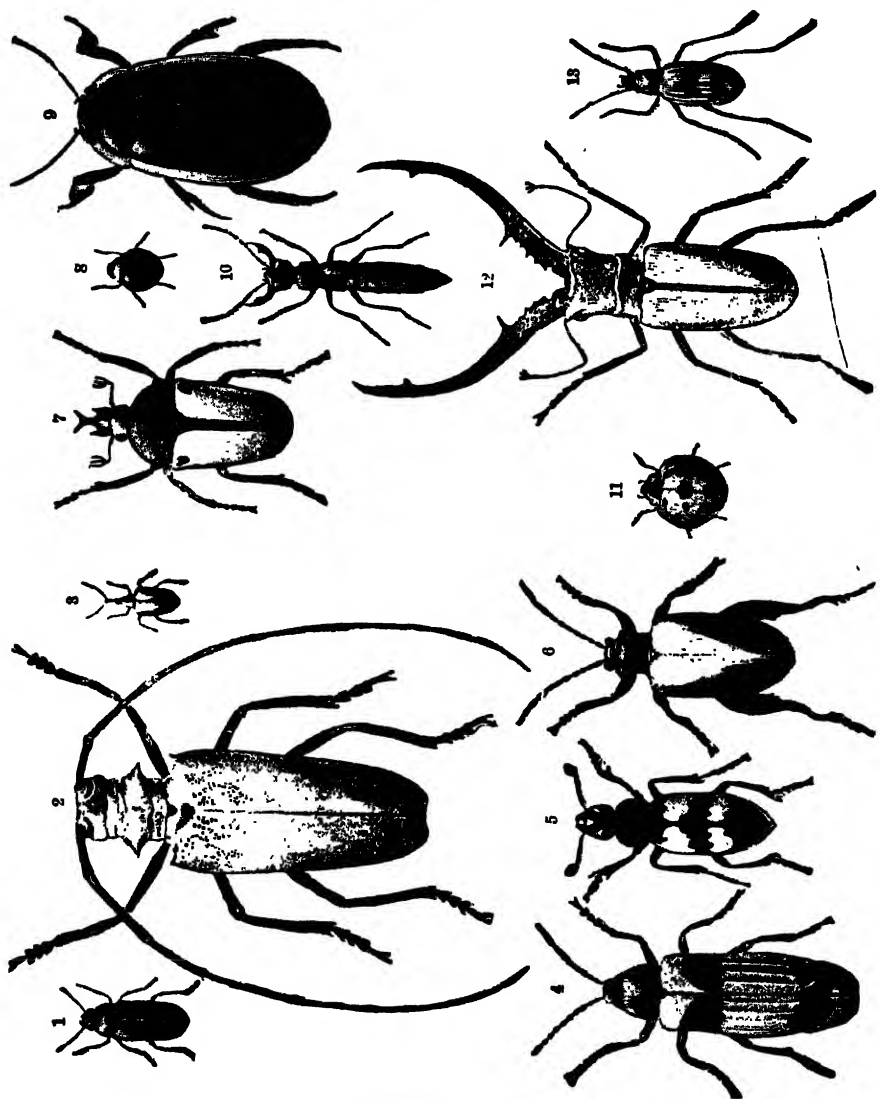
Consult Rowe, H. G., *Starting Right With Bees* (9th ed. 1948); Frisch, Karl von, *Bees; their Vision, Chemical Senses, and Language* (1950); Root, A. I., *The ABC and XYZ of Bee Culture* (rev. ed. 1950); Whitehead, S. B., and Shaw, F. R., *Honeybees and Their Management* (1951).

**Beeswax**, a yellow solid secreted by bees

and used in the formation of the honeycomb. It breaks with a granular fracture, and has an agreeable honey-like odor. It is prepared for use by draining away the honey and heating the wax in water, and is used for making candles, waxing polished floors, in medicine as

an ingredient in plasters and ointments, and for many other purposes. It is often adulterated with paraffin wax, vegetable waxes, and fats.

**Beet** (*Beta*), a garden vegetable grown for its fleshy, edible root, belonging to the order



*Representative Beetles.*

1. *Heteromera* (*Tenebrio*). 2. *Longicornia* (*Batocera*). 3. *Rhyncophora* (*Eustales*).
4. *Serricornia* (*Chrysochroa*). 5. *Clavicornia* (*Necrophorus*). 6. *Phytophaga* (*Sagro*). 7. *Lamellicornia* (*Ceratorrhina*). 8. *Malacodermata* (*Allochotes*). 9. *Hydradeiphaga* (*Cybisler*).
10. *Brachelytra* (*Ocytus*). 11. *Pseudotremera* (*Synonymchal*). 12. *Pectinicornia* (*Cyclommatus*).
13. *Geodeiphaga* (*Nebria*).

Chenopodiaceae. There are four or five species of the genus *Beta*, but *B. vulgaris*, from which all the garden varieties are derived, is the only one of economic importance. Its cultivation dates from two or three centuries B.C.

Some of the popular varieties of garden beet are Bassano, a white and red mixed; Early Blood Turnip, a deep rich red, turnip-shaped; Eclipse, bright red, fine-grained, and sweet; Egyptian, a rich deep red, with small tops; Edmand, round, smooth, and of good flavor.

*Chard*, or *Swiss Chard* is a variety of beet grown for its large succulent leaves, which are cooked and eaten like asparagus; the tender young leaves are used as a pot-herb and for salads.

The *Sugar Beet* is of the same species as the common garden variety but of a higher sugar content. See SUGAR BEET.

The *Mangel-wurzel* or *Fodder Beet* is a coarse large form of the common beet grown for animal food.

See SUGAR; SUGAR BEET. Consult U.S. Dept. of Agriculture's publications on *Sugar Beets*.

**Beet Fly** (*Anthomyia beta*), an insect the maggots of which feed on the pulp of beet leaves, and thus reduce them to dry skin.

**Beethoven, Ludwig van** (b. Bonn, Dec. 16, 1770; d. Vienna, Mar. 26, 1827), one of the greatest of musical composers. As a child he displayed unusual talent for music, and from the age of four was taught the violin and clavier by his father. In July, 1792, while on a visit to Bonn, Haydn 'greatly praised' a composition of Beethoven's which had been submitted to him; and in the autumn of that year Beethoven placed himself under Haydn in Vienna, where he spent the rest of his life. When twenty-eight years of age he began to suffer from partial deafness, which increased to such an extent that from 1822 onwards all communication with him had to be made in writing. Notwithstanding this, many of his greatest works were composed during this period.

At the age of ten Beethoven began the work of composition, and even for some time after the years of his pupillage wrote in accordance with the principles observed by Haydn, Mozart, and others; but at a later period he gradually introduced changes of treatment. His symphonies, concertos, chamber music, string quartets, sonatas for violin and for violin and piano, would each have been sufficient to earn for their composer undying fame. His vocal compositions include an oratorio, *The Mount of Olives*, two *Masses*, the *Choral Symphony*, and many other great works, be-

sides a large number of songs, etc. Consult Herriot, Edouard, *The Life and Times of Beethoven* (1935); Tovey, D. F., *Beethoven* (1945); Brockway, Wallace, and Weinstock, Herbert, *Men of Music* (rev. ed. 1950); Biancolli, L. L., and Peyser, H. F., eds., *Masters of the Orchestra* (1954).

**Beetles** (Coleoptera), a well-defined order of insects in which the cuticle is hard, and the first pair of wings are converted into scalelike wing covers (elytra), which cover and protect the posterior part of the body. The second pair of wings may function as organs of flight, or may be absent; but, as a rule, beetles are not adapted for an aerial life, and live mostly in concealed situations.

**Beets, Nikolaas** (1814-1903), Dutch writer, born at Haarlem; professor of theology (1875-84) at Utrecht University, but is chiefly noteworthy as the author of stories and sketches of Dutch life in graceful and humorous prose.



*Begonia*, single tuberous variety.

**Befana** (corruption of 'Epiphany'), legendary old woman who, sweeping the house when the three wise men passed by with gifts to the infant Christ, put off seeing them till their return, and is still awaiting them.

**Beg**, more commonly **Bey** ('lord'), Mohammedan title of the governor of a district or

town, but now also applied to officers, and used by almost every Turk of gentle birth.

**Begas, Reinhold** (1831-1911), German sculptor, pupil of Rauch. He first attracted notice by the *Borussia* (1861), on the facade of the Berlin Exchange, and confirmed his reputation by his statue of Schiller (1871), in the same city.

**Begbie, Harold** (1871-1929), a prolific English author and journalist who wrote about fifty books and thousands of newspaper columns. His books include *Great Men* (1899); *The Challenge* (1911); *Life of William Booth* (1919); *Shackleton: A Memory* (1922). Not until after his death was he revealed as the author of the sensational *Mirrors of Downing Street*, by 'A Gentleman with a Duster,' which appeared in 1920.

**Begbie, Sir Matthew Baillie** (1819-94), Canadian jurist, was born in Edinburgh, Scotland, and was educated in St. Peter's College, Cambridge. In 1870 he became Chief Justice of British Columbia and was knighted in 1871.

**Begg, James** (1808-83), Scottish Free Church minister, one of the leaders of the evangelical party in the movement that culminated in the disruption of the Church of Scotland (1843). Consult *Memoirs*, by Professor T. Smith.

**Beggar-my-neighbor**, a game at cards similar to that of 'catch honors.'

**Beggar's Lice** (*Echinoppermum virginicum*), or *Stickseed*, a common weed found in woods and thickets and along waysides, from Canada southward. It grows from 2 to 4 ft. high, with widely spreading branches, bearing oblong leaves, small whitish flowers, and globular nutlets covered with barbed prickles.

**Beggar Tick**, the name applied to several varieties of the Bur Marigold (*Bidens*), annual or perennial herbs.

**Beghards**, an association of men corresponding to the female Beguinages (see BEGUINES). The earliest record shows them established at Louvain about 1220. Toward the end of the 14th century severe measures were enforced against them and they were dispersed or became absorbed in the older and better regulated orders.

**Begin, Louis Nazaire** (1840-1925), Canadian cardinal, was born in Levis, Que. He was made archbishop of Quebec in 1898, and was elected a cardinal in 1914. His writings include *Aide-memoire, ou chronologie de l'histoire du Canada* (1886); *Cathechisme de controverse* (1902).

**Begonia**, a genus of tropical plants belong-

ing to the order Begonaceae, including nearly 500 species and many hybrids and variations, grown either for their beautiful foliage or for their showy blooms. Begonias are indigenous to Mexico, Central and South America, Asia, and South Africa; the first plants were introduced into England about 1780. The cultivated varieties of begonia may be considered under four headings—the fibrous-rooted, or winter-flowering; the ornamental-leaved, or rex; the tuberous, or summer-flowering; the semi-tuberous, winter-flowering. The tuberous-rooted begonia is the most popular and commercially the most important variety.

**Beg-Shehr**. See *Beishehr Göl*.

**Beguines**, (Beguinae, Beguttae), a semi-monastic association of women formed during the 12th century, probably by Lambert le Begue, a priest of Liege. They lived in villages or communities known as 'beguinages' (from *beginagium*, 'a vineyard') and devoted themselves to nursing the sick, the care of the poor, and other charitable and pious works. There are at present some beguinages in Belgium, Holland and France. See also BEGHARDS.

**Begum**, a Hindustani name denoting a woman of high rank, used principally of Mohammedan queens-regnant; also applied to the sultanas of seraglios.

**Behaim, Bocheim, or Behern, Martin** (c. 1459-1506), German cosmographer. In 1486 he settled at Horta, in the Azores. He is remembered especially for the globe which he constructed at Nuremberg in 1492 (twenty-one inches in diameter), the oldest globe extant. Consult Ravenstein's *Martin Behaim: His Life and His Globe*.

**Behar**. See *Bihar*.

**Behaviorism**, the science which regards psychology as the study of human and animal behavior. The behavioristic school of psychology may be considered as having been founded by Prof. John Broadus Watson in 1913 and has had great influence and growth in America but not in Europe. Experimental psychology has for a century made use both of introspective data and the 'objective' data of behavior; and behaviorism seeks to carry out all psychological investigation by the study of the latter only.

The behaviorist has regard to the functional relations of stimulus and response. In general, behaviorists regard as a stimulus any object that causes a response; for example, to a hungry animal food may be regarded the stimulus to eating. A response, strictly defined, is mus-

cular movement or glandular secretion that occurs as the result of stimulation, as in the reflex knee-jerk. However, this term is also used loosely for any gross form of behavior, like running away from a fearful object or approaching a desired object.

The discovery of the conditioned reflex by the Russian physiologist, I. P. Pavlov, has done much to validate the behavioristic method. The conditioned reflex also provides behaviorism with an equivalent of the law of association, which has long been a fundamental law in introspective psychology.

Behaviorism in its later form has sought to include much of the data of the older introspective psychology. It regards introspection as verbal behavior, and differs in this respect from introspective psychology only in that it emphasizes as important the actual words of the introspector, instead of the meaning of the words as descriptive of conscious events. Consult Morsey, G. A., *The Hows and Whys of Human Behavior* (1929); Watson, J. B., *Behaviorism* (rev. ed. 1930); Tolman, E. C., *Purposive Behavior in Animals and Man*.

**Behheading.** See **Capital Punishment**.

**Behemoth**, a colossal animal, real or imaginary, described with leviathan in Job.

**Behera**, province of Lower Egypt, with an area of 1,726 sq. m. The capital is Damanhur; p. 976,965.

**Behistun, Bisutun, or Baghistan**, mountain in the province of Kermanshah, Persia, about 22 m. e of Kermanshah. It rises to a perpendicular height of 1,700 ft. and about 300 ft. above ground bears sculptures and cuneiform inscriptions (in three languages—Persian, Babylonian, and Median) recording the deeds of Darius Hydaspes (500 B.C.). The inscriptions, which were deciphered and translated by Major-General Sir Henry Rawlinson, in 1835-7, set forth the king's genealogy and victorious deeds.

**Behm, Ernst** (1830-84), German geographer. His chief work was the compilation (with Hermann Wagner) of *Bevolkerung der Erde* (7 vols., 1872-82).

**Behmen, Jacob.** See **Boehme**.

**Behn, Aphra** (1640-89), English dramatist and novelist, 'the George Sand of the restoration,' was left a widow and took to writing novels, the first professional Englishwoman of letters.

**Behring.** See **Bering**.

**Behring, Emil Adolf** (1854-1917) German physician. In 1899 he was made assistant in the Institute of Hygiene, Berlin, and three years later was transferred to Koch's Institute

for Infectious Diseases, where he made his discovery of diphtheria antitoxin. For this work he received the Nobel prize in Medicine, 1901. He is notable also for his research work on tuberculosis, particularly bovine tuberculosis.

**Beijerland**, island, Holland, between the Old Maas and the Hollandsche Diep. Its fertile soil yields much flax.

**Beilstein, Friedrich Konrad** (1838-1905), Russian chemist, studied under Bunsen, Liebig, Wöhler, and Wurtz. Beilstein is world famous for his *Handbuch der organischen Chemie*, and also wrote *Anleitung zur qualitativen Analyse*.

**Beira**, province, Portugal, extending from the Atlantic to the Spanish frontier, and having the Douro for its northern boundary, and the Tagus for part of its southern boundary; p. 1,597,573 The capital and chief town is Coimbra.

**Beiram** See **Bairam**.

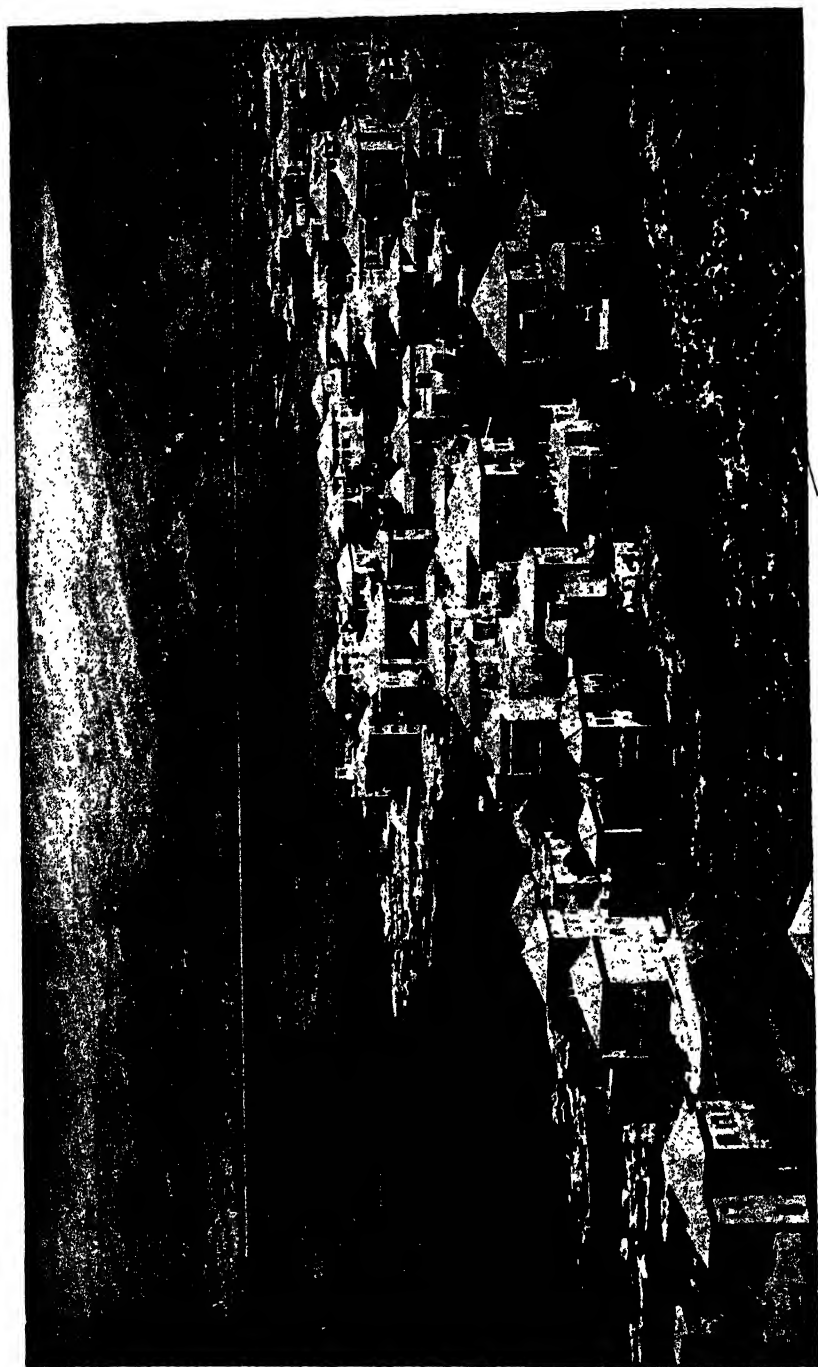
**Beirut**, or **Beyrout**, Mediterranean seaport, Syria, capital of the Lebanese Republic. It is the seat of a Greek and a Maronite bishop, and of the United Greek Patriarch of the Orient, and is the center of several foreign missions. It has two universities, an astronomical observatory, a society of Oriental languages, and many mosques, Christian churches, and schools. The American College (Presb.) is a most influential institution in Syria. Silk stuffs, gold and silver thread, and porous earthenware are manufactured, and through the port pass the imports and exports of all Syria. Exports consist chiefly of silk, wool, oils, soap, lemons, and oranges; imports of iron, cotton goods, coffee, rice, sugar, and fancy goods. The population is about 211,000.

Beirut is the ancient Berytus, and was a port of the Phoenicians. It later came under the power of Egypt, from whom it was taken by Antiochus the Great, and so became part of Syria. It was conquered for the Romans by Agrippa and during the crusades it belonged alternately to the Christians and to the Saracens. Its modern growth dates from 1843 when steam navigation was introduced. In World War I Beirut was occupied by British and French troops. It was placed under French mandate in 1919. See illustration.

**Beisaeher Göl**, lake, Asia Minor, 40 m. w. of Konieh. It is 38 m. long by 5 to 10 m. broad.

**Beissel, Johann Conrad** (1690-1768), German-American religious propagandist. He was banished for irregular religious views, and set-





*Beirut, Syria. View of the Harbor from the American College.*

tled in Germantown, Pennsylvania, about 1720, where he later allied himself with the Dunkards.

**Boit-el-Fakih**, trading center in Yemen, Arabia, near the Red Sea.

**Beja** (anc. *Pax Julia*), town and episcopal see, Portugal, in the district of Beja; 95 m. s.e. of Lisbon; p. 12,875.

**Beja**, administrative district of the province of Alemtejo, Portugal, with an area of 3,958 sq. m.; p. 200,615.

**Bejan**, or **Bajan** (cf. Fr. *bec jaune*, Med. Lat. *bejanus*, 'yellow beak'), the common name for freshmen in universities in the Middle Ages.

**Bekaa**, **El**, or **El Bika**, a valley in Syria, lying at an altitude of 2,600 to 3,000 ft., between the ranges of the Lebanon, stretching from the sources of the Jordan to the upper course of the Nahr-el-Asi.

**Beke**, **Charles Tilstone** (1800-74), English explorer, in 1834 published the results of his researches in primeval history, in *Origines Biblicæ*. Much of his time was devoted to the identification of Biblical localities, especially of Mount Sinai (1874).

**Bekker**, **Elisabeth** (1738-1804), Dutch novelist and poetess, wrote, in conjunction with Agatha Döcken, what are practically the first modern Dutch novels—*Histoire van Mevrouw Sara Burgerhart* (1782), etc.

**Bekker**, **Immanuel** (1785-1871), German philologist. He is best known by his editions of the classics, including *Homer* (1858), *Aristophanes* (1829), and *Aristotle* (1831).

**Bel**, title of the principal Babylonian deity, signifying, like Baal, 'owner' or 'lord.' See BABYLONIA.

**Bela**, the name of several Hungarian kings of the Arpad dynasty. BELA I. deposed his brother Andrew I. in 1060. BELA III. (d. 1196) succeeded his brother, Stephen III., in 1174. BELA IV. ascended the throne in 1235, and six years later was driven from it by the Mongols under Batu Khan. He sought refuge in Austria, but regained his throne in 1244 and reigned until 1270.

**Bel and the Dragon**, a book of the Apocrypha, consisting of two legends setting forth the wisdom of the prophet Daniel. See APOCRYPHA.

**Belasco**, **David** (1853-1931), American dramatist, was born in San Francisco and educated at Lincoln College, California; was stage manager at several San Francisco theaters (1879-81), and at the Madison Square Theater, New York (1881), and in 1886 became manager of the Lyceum Theater. Nine

years later he established Belasco's Theater in the same city, and was manager of E. H. Sothern, Mrs. Leslie Carter, David Warfield, Blanche Bates, and Lenore Ulric. Pneumonia caused his death in 1931 while his last play, *Tonight Or Never*, was a Broadway success. In more than fifty years in the theater he produced more than 400 plays and launched the careers of many stars. Belasco's first success as a playwright was with *May Blossom* (1884). Other plays produced by Belasco are *Lord Chumley*, *Men and Women*, *The Charity Ball*, *The Wife* (all with H. C. de Mille); *Madame Butterfly* (1900; founded on the story of the same name by John Luther Long); *The Girl of the Golden West* (1905); *The Return of Peter Grimm* (1911); *Kiki* (1921, an adaptation).

**Belcher**, **Sir Edward** (1799-1877), British admiral and explorer. He wrote *Narrative of a Voyage round the World in H.M.S. 'Sulphur' in 1834-42* (1843), and a treatise on nautical surveying.

**Belcher**, **Jonathan** (1681-1757), American colonial governor, was born in Cambridge, Mass. In 1747 he was appointed governor of New Jersey, where he was a notable benefactor of the College of New Jersey (Princeton).

**Belem**, city, Brazil. See PARA.

**Belem**, a suburb of Lisbon, Portugal. See LISBON.

**Belemnites**, (Gr. *belemnion*, 'a dart' or 'arrow'), an interesting genus of fossil cephalopodous Mollusca, the type of a family called Belemnitidae or Belemnites, and closely allied to the cuttle family. No recent species is known. Fossil species, which are numerous, are found in all the Jurassic and Cretaceous strata.

**Belfast**, seaport, capital of Northern Ireland and a parliamentary and municipal borough in counties Antrim and Down, situated on the river Lagan at the head of Belfast Lough; 113 m. n. of Dublin. Noteworthy edifices are the City Hall, erected in 1906 on the site of the old Linen Hall, the Post Office, Library, Belfast Museum, St. Anne's Cathedral (P. E.), St. Peter's Church (R. C.), Carlisle Memorial Church, Ulster Bank, and Custom House. Educational institutions include Queen's College, Methodist College, Presbyterian Theological College, Municipal Technical Institute and Campbell College.

Belfast is an important manufacturing and commercial town, and has large shipyards. Some of the largest ships afloat, as the *Cedric*, *Baltic*, *Olympic* and *Titanic*, have been constructed. The chief industries of Ulster, both

controlled in Belfast, are linen weaving and shipbuilding.

The harbor, which is safe and commodious, is provided with extensive docks and quays; p. 448,000. In 1177 a castle was erected on the site of Belfast. In 1604 the castle was granted to Sir Arthur Chichester, who was really the founder of Belfast. It was incorporated as a municipality in 1613, as a city in 1888.

**Belfast**, seaport city, Maine, county seat of Waldo co., on Penobscot Bay. A deep, spacious harbor adds to the city's importance as a seaport, and it has a good shipbuilding trade; p. 5,960.

**Belfast Lough**, deep and picturesque arm of the sea (14 m. long by 6 m. broad), between counties Antrim and Down, province of Ulster, Ireland.

**Belfort**, town, France, capital on the Territory of Belfort and a fortress of the first class; 171 m. s.e. of Troyes. p. 37,387. Belfort was founded about the 11th century and in the Franco-German War it was besieged by the Germans.

**Belfort, Territory of**, small district (235 sq. m.) on the eastern frontier of France, forming the remnant of the former department of Haut-Rhin, ceded to Germany in 1871; p. 86,648.

**Belfry**, in its modern sense, a bell-tower, and, in a more restricted sense, the chamber of a tower in which the bells are hung. Originally it was applied to the wooden tower on wheels which was used by besiegers in attacking a castle. See **BELL**; **CAMPANILE**.

**Belgæ**, a nation of Germanic origin, who dwelt in the n.e. of Gaul, between the Rhine, the English Channel, and the Seine. Caesar subdued them after prolonged resistance.

**Belgaum**, chief town in the district of the same name, Bombay Presidency, India; p. 58,319.

**Belgian Congo**. See **Congo, Belgian**.

**Belgiojoso, Cristina, Princess of** (1808-71), Italian writer and patriot, was born in Milan, where she also died. She wrote *Essai sur la Formation du Dogme Catholique* (4 vols. 1842-3), *Souvenirs d'Exil* (1859), *Histoire de la Maison de Savoie* (1860), etc.

**Belgium**, a small country of Western Europe, formerly a part of the Low Countries or the Netherlands (q.v.), bounded on the n. by the North Sea and Holland, on the e. by Holland, Prussia, and Luxemburg, on the w. and s. by France. The total area is about 11,775 sq. m.; the greatest length from n.w.

to s.w., 173 m.; the greatest breadth from n. to s., 105 m.; the coast line 42 m.

The surface of Belgium slopes from the s.e. to the North Sea, and is drained by the Scheldt and the Meuse (Maas) and their numerous tributaries, of which the most important is the Sambre. The climate is generally temperate. In the plains near the sea it is cool, humid, and somewhat unhealthy; in the higher districts in the southeast, hot summers alternate with very cold winters. The rainfall ranges from 27.5 inches in the w. to 40 inches in the district e. of the Meuse. The geological formations of Belgium are closely associated with those of France and England. The greater portion of the country is covered with *Tertiary deposits* in which the different geological periods are fully represented. Mineral Products are abundant and constitute an important source of the country's prosperity—coal, iron, copper, zinc, lead, alum, manganese, marble, slate, and limestone being found within its borders.

Manufacturing ranks with mining as one of Belgium's most important industries, cheap and abundant fuel being a great incentive. The principal manufactured products are textiles (linens, woollens, cotton, and silk), lace, leather, and metals.

The great seats of the linen industry, the oldest in Belgium, are in Flanders. Lace manufacture is also largely Flemish, and though it has declined in recent years still gives employment to thousands of workers.

Belgium's manufacturing interests suffered heavily during World War I (1914-18), the German government from the beginning systematically stripping the factories of machinery and tools. Compared with mining and manufacturing, agriculture is of somewhat minor importance, and a constantly diminishing number of people are engaging in it.

Under an intensive and scientific system of cultivation, carried out with industrious energy, the Belgian farmer succeeds in extracting the utmost possible out of the soil, in which undertaking he is earnestly seconded by government aid and advice. During the War transportation facilities had been paralyzed but reparation for all damage was exacted by the Treaty of Peace.

The population is about 8,778,000, making Belgium one of the most densely populated countries in Europe. The people consist of two races, the Flemings and Walloons, with small numbers of Germans, French, and Dutch. The principal cities are: Brussels, the

capital, with all its suburbs 1,308,831; Antwerp, 794,280; Liege, 573,176; Charleroi, 445,229; Ghent, 442,792.

The Roman Catholic is the dominant religion, although full liberty of worship is guaranteed to all. Higher education is provided for by universities at Louvain, Brussels, Ghent, and Liege—the two latter maintained by the state.

**Army.**—The Belgian army was a force intended solely for defence and to preserve the neutrality of the country. During World War I voluntary enlistment greatly increased and compulsory service was extended, bringing the mobilized strength to 267,000 at the signing of the Armistice. Casualties sustained during the war were placed at 90,000, including 20,000 dead, 60,000 wounded, and 10,000 prisoners and missing.

The government of Belgium is a limited constitutional and hereditary monarchy, established in its present form in 1830. The legislative power is vested in the King, the Senate, and the Chamber of Deputies. The Senate, or Upper House, is composed of 120 members, part of whom are chosen by direct vote, part by the provincial councils. Members of the Lower House are elected directly by the people on the basis of population. The executive power is vested in the king and a responsible ministry. Universal male suffrage obtains and failure to vote is a misdemeanor.

For administrative purposes the kingdom is divided into nine provinces, which are subdivided into cantons and communes. Each province has a governor appointed by the king and a provincial council elected by popular vote, with jurisdiction in all provincial matters not provided for in the general administration.

The history of Belgium as an independent kingdom commences in 1830, when it separated from Holland (see NETHERLANDS). The union of what had been the Spanish or Austrian Netherlands to Holland in 1815 was from the first an arbitrary one, as the people of the northern and southern parts of the united kingdom differed essentially in religion, language, interests, and historic feeling.

Under William I., the Belgians had become more and more dissatisfied, and finally, on August 25, 1830, they rose in revolt. After weeks of rioting and fighting, a provisional government was formed; Prince Frederick the son of the Dutch king, who had attempted to quell the revolt, was compelled to retreat from Brussels to Antwerp, having suffered considerable loss; and on Oct. 4 Belgian independence was declared. The crown was of-

fered to Leopold of Saxe-Coburg, husband of Princess Charlotte of England, and he ascended the throne as Leopold I. on June 21, 1831.

Immediately upon the accession of Leopold, the Dutch invaded Belgium and in the ensuing struggle disaster was prevented only by the arrival of aid from France. This intervention alarmed the other powers, especially England, and as a result, the treaty of London (1831), guaranteeing the neutrality of the new kingdom, was signed by the five great powers, King William of Holland reluctantly assenting to the treaty in 1839.

By 1884 Socialism was becoming more and more a force to be reckoned with in Belgian politics, and in 1886 a socialist rising at Liege spread rapidly to other industrial centers. Proportional representation in all parliamentary elections was secured in 1900, and in 1919 plural voting was superseded by pure manhood suffrage. King Leopold II., who had followed Leopold I. in 1865, died in 1909, and was succeeded by his nephew, Albert I.

Prior to the outbreak of World War I the neutrality of Belgium, as guaranteed in 1831 and 1839, was considered an inviolable principle of European law. Germany, however, claiming knowledge that France intended to violate Belgian neutrality, by ultimatum demanded of the Belgian government a free passage to France, and upon Belgium's refusal, invaded the country on Aug. 4, forcing the retreat of the gallant Belgian army. Before the close of 1914 practically all of Belgium was occupied by the enemy. General von Bissing was appointed German military governor and upon his death in April, 1917, was succeeded by General Von Falkenhausen.

The history of the German *regime* in Belgium is one of systematic spoliation and oppression. By 1916 the Belgian army, reorganized and re-equipped, had taken its place on the Western front. In the great autumn offensive of 1918, directed by Marshal Foch, the Belgians co-operated gallantly with Allied units in retaking Ostend, Zeebrugge and Bruges; they aided in driving the enemy from Flanders and took part in the grand finale which brought victory and with it the complete evacuation of Belgian soil. On Nov. 22, 1918, King Albert triumphantly re-entered his capital. (See ARMISTICE.)

The Peace Conference decided (June 24, 1919) that Belgium be granted priority payment of \$500,000,000 from the German indemnities. The Belgian war debt to the United States was funded in 1925; it was enormously

**Belg**

reduced and payments spread over 62 years, involving a grand total of \$727,830,500.

In 1930 Belgium celebrated her first century of independence by holding two great exhibitions of industry, arts and science in Antwerp and Liege. Princess Marie Jose, only daughter of the King and Queen of the Belgians, was married to Crown Prince Umberto of Italy, at Rome, in January, 1930. On Feb. 17, 1934, King Albert was killed while mountain climbing, and was succeeded by his son, Leopold III, who ascended the throne Feb. 23.

Leopold III married, on November 10, 1926, Princess Astrid (born November 19, 1905), daughter of Prince Carl, brother of the King of Sweden. Queen Astrid was killed in an automobile accident near Lucerne, Switzerland, on August 29, 1935.

On October 14, 1936, King Leopold announced that his country had severed her military alliances and resumed her neutrality of pre-war days.

With the outbreak of the European war in Sept. 1939, Belgium again feared that she would become one of the major battle fields as in World War I (1914-18). With the end of the Polish campaign in late Sept., Ger. moved her victorious army to the west and a large part of it was massed near the Belgium and Netherlands frontiers. In May 1940 the Germans struck at Belgium in a movement to invade France. The Belgian army fought well but the superior mechanized equipment and air force of the Germans soon forced the Belgians back. British and French support rushed to Belgium. They likewise lacked modern equipment but were resisting stubbornly when King Leopold suddenly ordered his army to cease fighting. This break in the allied line was followed by the British embarkation from Dunkirk and the collapse of France, after which Belgium fell under ruthless German domination. September, 1944, the Allies drove the Germans from Belgium. Consult Gibson, Hugh, *Belgium* (1939); Ogrizek, Dore, ed., *Belgium and Luxembourg* (1950).

The Commission for Relief in Belgium was an international organization, formed in 1914 by American and Spanish diplomats in Europe to care for the civilians in the war-devastated districts of Belgium and Northern France. Headquarters were established in London with branches in New York, Rotterdam, Paris and Brussels, and Herbert C. Hoover, afterwards President of the United States (q.v.), was appointed chairman and director of affairs in Belgium. For a period

of four years and ten months the Commission fed and otherwise provided for 9,000,000 people in Belgium and Northern France.

In World War II the Germans overran the country. A government-in-exile was set up in London, but the king was outlawed for having surrendered the army. In 1944 the government returned, but King Leopold was barred and the regency was continued. Belgium was heavily bombed in the War. See McKenney, R., *Far, Far From Home* (1954).

**Belgorod**, chief city of Belgorodsk District; U. S. S. R.; rail junction on the line to Kursk; p. 10,000. Taken by the Germans in 1942, it was retaken by the Russians, Feb., 1943; lost to the Germans, March; retaken by the Russians, Aug. 1943.

**Belgrade**, city, capital of Yugoslavia, is situated at the junction of the rivers Danube and Save. The famous citadel, now in a somewhat dilapidated condition, stands on a hill 133 ft. high, overlooking the two rivers. In its upper part are prisons and an army museum; in the lower part barracks, magazines, the *Heboyska* (torture tower), and the Emperor Charles Gate. Kalemegdan Park, a favorite resort and one of the city's chief attractions, lies just south of the fortress. Beyond this is the town proper—prior to World War I a thoroughly modern city with wide streets and fine buildings; p. 500,000.

In World War I (1914-19) Belgrade was bombarded by the Austrians on July 29, 1914. It was evacuated by the Serbians Dec. 1, 1914, having been practically reduced to ruins by bombardment, was occupied by the enemy Dec. 2, and was retaken by the Serbians Dec. 5. It fell again on Oct. 9, 1915, and remained under Austrian control until Nov. 3, 1918, when it was re-occupied by the Serbians. Belgrade was bombed and seized by the Germans in April, 1941, and taken by the Russians October 20, 1944.

**Belgravia**, a fashionable district in the southern part of the West End of London, built 1826-1852. It borders on Hyde Park, Green Park, and Buckingham Palace Gardens.

**Belial**, a Hebrew word meaning worthlessness or wickedness in an ethical sense, usually found in connection with a person, as 'man of Belial.'

**Belinsky**, Visarion Grigorievitch (1810-48), Russian literary critic. His first important work, an admirable *Survey of Russian Literature since the Eighteenth Century*, appeared in 1834. It was he who first showed the real value of the works of Pushkin, Lermontov, and Gogol to the national literature. His com-

plete works appeared in 1859-62 in twelve volumes.

**Belisarius**, (c. 500-565) (Slav. Beli-tzar, 'white prince'), the greatest general of the Byzantine empire, is said to have been a native of Thrace. After Justinian's accession to the throne in A.D. 527, Belisarius was appointed to the command of the eastern army of the Empire. Between 529 and 532 he was occupied in repelling the inroads of the Persians; but Africa and Italy were the scenes of his greatest exploits.

In 535 Belisarius conquered Sicily. In 536 he occupied Lower Italy and entered Rome, which he defended for a year against Vitiges, the Gothic king. Belisarius gained his last victory against the invading Bulgarians in 559. In 563 he was accused of conspiring against Justinian, and was imprisoned for seven months, his property being confiscated. He was, however, restored to full honors by the emperor.

The chief authorities on the life of Belisarius are the *Histories* of Procopius (his private secretary), Agathias, and Theophanes. Consult also Gibbon's *Decline and Fall*; Mahon's *Life of Belisarius*.

**Belize**, (so named from the Spanish pronunciation of Wallace, a Scottish buccaneer), the capital of British Honduras, is situated on the Caribbean Sea at the mouth of the Belize River; p. 12,661.

**Beljame, Alexandre** (1842-1906), French writer and professor of English literature at the Sorbonne, Paris, was born at Villers-le-Bel, Seine-et-Oise. His works include *Le public et les hommes de lettres en Angleterre au XVIII<sup>e</sup> siècle* (1881).

**Belkine, Ivan**, pseudonym of the Russian author, Pushkin.

**Belknap, George Eugene** (1832-1903), American naval officer, was born in Newport, N. H. He invented apparatus for determining the character of the sea floor, and published a work, *Deep Sea Soundings*. He became rear-admiral in 1889, and commanded the U. S. fleet on the Asiatic station from 1889 to 1892. He retired in 1894.

**Belknap, William Worth** (1829-90), American politician and soldier, was born at Newburg, N. Y. He was Secretary of War from 1869 to 1876.

**Bell**, a hollow metal instrument, usually cup-shaped, which, when struck, gives forth a ringing sound. Early specimens of bells have been found in Egyptian tombs, and small bronze articles, supposed to be bells, have been dug up in the ruins of Nineveh. The festival

of the Egyptian Isis was celebrated with the sound of bells, and in the Old Testament bells of gold are mentioned as being suspended from the robes of the high priest. They were also used in Old Testament times in the trappings of horses and as ornaments. The Persians employed them for ornamentation, and in India and China they were probably known long before they were in use in Europe.

It is uncertain when bells were first employed in the Christian Church, although their introduction has been generally attributed to Paulinus, bishop of Nola (400 A.D.). Bede mentions bells as being in use in England about the end of the 7th century, and in the 10th century St. Dunstan appears to have introduced them very generally. They play an especially important rôle in the services of the Roman Catholic Church.

The most familiar secular use of the bell is the tolling or ringing of the hours. This practice is referred to by Lucian (b. circa 125 A.D.). The curfew bell (Fr. *couvre feu*) is a later development. It was introduced into England from Normandy by William the Conqueror, and was rung at eight o'clock in the evening, to warn all persons to extinguish fire and light—a necessary precaution, when houses were built of wood. The *tocsin*, or alarm bell, was hung in castles and fortresses, where it was sounded to announce the approach of an enemy.

Bells have been made in a great variety of forms and of a still greater variety of substances, but since the middle ages, for bells which are required to possess a high degree of richness and volume of tone, a modification of the hemispherical form and an alloy of copper and tin—called *bell-metal*—have been universally regarded as superior to all others. Now, as in mediæval times, bells are cast by forming a bell-shaped model, covering this with a larger mould and, through an opening in the top of the latter, pouring in molten metal until the space between the two is completely filled.

Bells are sounded either by being *swung* or by being *chimed*. A *peal* of bells is a suite of bells tuned in certain relations to each other. Peals of 'swung' bells never contain a greater number than twelve, but peals of 'chimed' bells—termed *carillon-peals*—may comprise forty or more. *Change-ringing* is the art of constantly varying, in accordance with certain prescribed rules, the order in which peals of 'swung' bells are rung.

Bells may be 'chimed' in various ways, but the term is generally understood to imply that,

instead of being swung, the bells are struck—usually on the outside—by a hammer or wooden mallet. Among celebrated carillon-peals on the Continent, some of which are capable of being played either mechanically or by hand, are those of Antwerp, Bruges, Ghent, Louvain, Malines and Tournai; while of noteworthy English carillons may be mentioned those at Boston, Bradford, Manchester, Rochdale, Shoreditch and Worcester. In New York City, in the tower of the Metropolitan Life Insurance Building, is a chime of four bells, weighing about 7 tons, and said to ring at twice the height of any other peal in the world. Another notable chime in the United States is that in the Chapel at West Point, consisting of twelve bells and said to be one of the finest in the world. The largest carillon in the world is in the Riverside Church, New York City. Tubular chimed bells are a recent invention.

Bells were at first comparatively small in size but about the 13th century bells of large size were beginning to be cast and by the 15th century some attained huge dimensions. The largest bell in the world, the great bell of Moscow, was cast in 1733, and weighs 198 tons. The finest collection of bells in any country is said to be that at the Mission Inn, Riverside, California. See also ELECTRIC BELL; and for pneumatic bell, PNEUMATIC APPLIANCES.

**Bell, Acton, Currer, and Ellis**, pseudonyms of the Brontes. See also BRONTE.

**Bell, Alexander Graham** (1847-1922), American scientist and inventor of the telephone, the son of Alexander Melville Bell, the inventor of 'Visible Speech' (q.v.), was born in Edinburgh, and moved to Canada, 1870, and Boston, 1871. In 1876 he exhibited at the Philadelphia Exhibition the telephone, which he had been working on for some four years, and a company was organized for its development. He also invented the photophone (1880) and the graphophone (1883). His last few years were spent in efforts to make wider applications of his greatest invention, the telephone, and in the development of aviation, in which he took great interest. He died at Baddeck, Nova Scotia, Aug. 2, 1922. He was the author of many educational and scientific monographs. In 1950 he was admitted to the Hall of Fame. See also TELEPHONY.

**Bell, Alexander Melville** (1819-1905), Scottish-American educator, father of Alexander Graham Bell, was born in Edinburgh, Scotland. His great work was the formulation of a method of instruction in phonology,

known as Visible Speech, which has been successfully used in teaching deaf-mutes to speak.

**Bell, Andrew** (1753-1832), founder of the Madras system of education, was born and educated in St. Andrews, Scotland. In 1789 he became superintendent of the Madras Male Orphan Asylum, where he developed the monitorial system of education, explained in his work, *An Experiment in Education* (1797). See Southey's *Life of Bell* (1844); Meiklejohn's *An Old Educational Reformer* (1881).

**Bell, Sir Charles** (1774-1842), discoverer of the distinct functions of the nerves. In 1804 he contributed the account of the nervous system to his brother John Bell's *Anatomy of the Human Body*. Bell's great achievement was the discovery of the existence of distinct motor and sensory nerves, and the further discovery that the spinal cord gives off filaments of both kinds, the anterior roots being motor and the posterior sensory. Knighted on the accession of William IV., Bell accepted the chair of surgery at Edinburgh University in 1836. He was author of *A System of Operative Surgery* (1807), *The Nervous System of the Human Body* (1830), and several other books, chiefly surgical. See *Letters of Sir Charles Bell* (1870).

**Bell, George Joseph** (1770-1843), advocate, brother of Sir Charles Bell, was admitted to the Scottish bar (1791). His *Treatise on the Laws of Bankruptcy in Scotland* (1804), republished in 1810 under the title *Commentaries on the Laws of Scotland* (7th ed. 1870), at once took rank as the authority in the domain of mercantile jurisprudence.

**Bell, Henry** (1767-1830), one of the earliest introducers of practical steam navigation into the United Kingdom, was born at Torphichen Mill, near Linlithgow, Scotland. It has been said that Robert Fulton, who built the first passenger steamboat, derived his ideas of steam navigation from Bell. See also STEAM ENGINE.

**Bell, Henry Thomas Mackenzie** (1856-1930), English poet and critic. A selection of verse appeared in 1901.

**Bell, James Franklin** (1856-1919), American soldier, born in Shelbyville, Ky., was graduated at the U. S. Military Academy in 1878, served in the Philippines during the Spanish-American war till 1903 and was promoted major-general in 1907.

**Bell, James Montgomery** (1837-1919), American soldier, born at Williamsburg, Pa., served with distinction in the Philippines, where he became military governor of the 3d district of Southern Luzon, 1900, retiring in 1901 with the rank of brigadier-general.

**Bell, John** (1763-1820), surgeon, elder brother of Sir Charles Bell. Leading operating surgeon in Edinburgh, and showed himself a bold innovator in surgical practice.

**Bell, John** (1797-1869), American political leader, born near Nashville, Tenn. He graduated at the University of Nashville in 1814, was admitted to the bar in 1816, and became a prominent lawyer and political leader, being a Democrat until 1835, and thereafter a Whig.

**Bell, John** (1811-95), an English sculptor, born in Norfolk. His first exhibited work was a religious group (Royal Academy, 1832). Among his public works are the *Guards' Memorial* in Waterloo Place (1858), and the *United States* group in the Prince Consort Memorial, Hyde Park (1873). A copy of the latter is in Washington, D. C.

**Bell, Robert** (1800-67), Irish journalist and miscellaneous writer, edited the London *Atlas* for many years. His great work is his unfinished annotated edition of the English poets.

**Bell, Robert** (1814-1917), acting director, Geological Survey of Canada (1901-6), born at Toronto. The western branch of the Nodaway which he surveyed in 1895, is named Bell River after him.

**Bell, Thomas** (1792-1880), dental surgeon and zoologist. Chief work: *History of British Quadrupeds* (1837; revised 1874).

**Belladonna**, a name for the deadly nightshade or common dwale (*Atropa belladonna*), a perennial poisonous plant of the order Solanaceae, indigenous to S. Europe and Asia, and cultivated in the United States. Belladonna is useful in medicine chiefly by virtue of its active principle atropine, procured from the root by distillation, first with alcohol, and at a later stage with chloroform, after which it forms colorless crystals. There are two extracts of belladonna, a tincture, a plaster, ointment, and liniment; atropine is also used hypodermically, in an ointment, and in lamellae or discs, for ophthalmic purposes. Applied to the eye, it dilates the pupil by paralyzing accommodation, and is therefore used by the ophthalmic surgeon when examining the fundus of the eye, and to prevent adhesions of the iris in inflammation. Internally given, its action proceeds on the same lines.

**Belladonna Lily** (*Amaryllis belladonna*), a native of the Cape of Good Hope, which is hardy only in the Southern United States.

**Bellagio**, town and summer resort, province Como, Italy, on the s. shore of the Lake of Como, at the apex of the peninsula which divides the two s. arms of the lake; p. 3,635.

**Bellamy, Edward** (1850-98), American au-

thor, was born at Chicopee Falls, Mass., established with his brother the Springfield *Daily News*. His socialistic romance, *Looking Backward*, 2000-1887 (1888), was enormously successful, causing the formation of 'Nationalist' clubs throughout the United States, and being translated into many foreign languages.



*Belladonna and Fruit.*

**Bellamy, George Anne**, 'Georgiana' (? 1731-88), an Irish-English actress, was daughter of Lord Tyrawley, ambassador at Lisbon. She played Juliet with Garrick (1750). See her own *Apology* (6 vols. 1785); *Actors and Actresses of Great Britain and the United States* (1886).

**Bellamy, Jacobus** (1757-86), a distinguished Dutch poet, was born at Flushing. *Rosje* was his most celebrated poem (1784).

**Bellanca, Giuseppe Mario** (1886- ), Italian designer of airplanes. The *Columbia* in which Clarence Chamberlin and Charles A. Levine flew from New York to Kottbus, Germany, in 1927, was of his design.

**Bell Animalcules.** See *Vorticella*.

**Bellarmino, or Bellarmino, Robert Francis Romulus** (1542-1621), Roman Catholic theologian, was born at Montepulciano in Tuscany. He became a Jesuit (1560), and was made cardinal in 1590, and archbishop of Capua in 1601, but resigned this post in 1605. He was a rigorous ascetic, and one of the greatest theologians that the Roman Catholic Church has produced. His works include: *Disputatio de Controversiis Christianae Fidei* (3 vols., 1581). *De Ascensione Mentis in Deum*.

**Bellary**, district and town, Madras, India.



The district, lying between the Nizam's territories and Mysore, has an area of 5,714 sq. m. The town is one of the principal military stations in Madras; p. (dist.) 950,000; (town) 58,000.

**Bellatrix** (Orionis), a white star of 1.6 photometric magnitude, situated in the right shoulder of Orion. Bellatrix is a typical helium star.

**Bellay, Joachim du** (1524-60), French poet surnamed 'The French Ovid,' and 'Prince of the Sonnet,' was born in Lyre, near Angers. He was closely associated with Ronsard, and with the famous group of poets known as the *Pleiade*. A few of his poems—among them his best known piece, *Vanneur*—have been translated by A. Lang in *Ballads and Lyrics of Old France* (1872).

**Bell Bird**, a name given to various birds on account of their bell-like note. It is applied especially to *Chasmorhynchus niveus*, the campanero of the Spanish settlers in Guiana, one of the chatters; and to *Anthornis melanura* in New Zealand.

**Bell Buoy**. See **Buoy**.

**Belle Alliance**, a farm in the center of the French position at the battle of Waterloo, 13 m. s. of Brussels, in Belgium. Belle Alliance is the name the Prussians give to the battle.

**Belleau Wood** (Fr. *Bois de Belleau*), a wooded height, in the region n.w. of Chateau Thierry, France, occupied by the Germans during World War I. It was attacked by the Second Division of the American Army (including two regiments of Marines) on June 10, 1918, and the following day, after violent fighting, was reported cleared of the enemy. A counter attack was opened by the Germans on June 13 and fighting of the most desperate character was continued until June 26, when the Allied possession of the wood was assured. In honor of the brilliant exploits of the U. S. Marines the wood was renamed by special order of General Degoutte, *Bois de la Brigade de Marine*.

**Belleek**, town, county Fermanagh, Ulster, Ireland. It is famous for its production of *Belleek China*, a fine grade of porcelain highly glazed.

**Bellefontaine**, city, Ohio, county seat of Logan co., 30 m. n. of Springfield; p. 10,232.

**Bellefonte**, borough, Pennsylvania, county seat of Centre co., 34 m. s.e. of Clearfield; p. 5,651.

**Belle Fourche River**, the northern fork of the Cheyenne River.

**Belle-Ile-en-Mer**, island, Atlantic Ocean, forming a part of the dept. of Morbihan.

France, lies 7 m. s. of Quiberon Point, France. It is 11 m. long and from 2 to 7 m. wide, with an area of 34 sq. m. It was taken by the British in 1761, but was restored to France by the Treaty of Paris in 1763; p. 10,000.

**Belle Isle**, a rocky island, 9 m. long and 3 m. broad, at the Atlantic entrance to Strait of Belle Isle, Newfoundland; has two light-houses, one of them 250 ft. high. It is noted as the place of origin of the Newfoundland dog.

**Belle Isle**, island, Conception Bay, Newfoundland, about 6 m. long and 3 m. broad.

**Belle Isle, Charles Louis Auguste Fouquet, Duc de** (1684-1761), French marshal, grandson of the famous intendant Fouquet, was born at Villefranche in Aveyron. He served with distinction in the War of the Spanish Succession, and was made governor of Metz and a marshal of France. He became minister of war in 1758, and created the military Order of Merit in 1750.

**Belle Plaine**, city, Iowa, Benton co., on the Iowa River 34 m. s.e. of Marshalltown. p. 3,056.

**Bellerophon**, a genus of univalve molluscs abundant in the earlier geological formations. The shells are globular, coiled in a flat spiral in one plane.

**Bellerophon** (originally called Hippo-nous), in Greek legend, son of Glaucus, king of Corinth, and of Eurymede, daughter of Sisyphus. Mounted on Pegasus he slew the Chimaera with arrows.

**Belleville**, city, Illinois, county seat of St. Clair co., 18 m. s.e. of St. Louis. It is the see of a Roman Catholic bishop; p. 32,721.

**Belleville**, town, New Jersey, Essex co. Industries include brass foundries and manufactures of chemicals; p. 32,019.

**Belleville**, town, Ontario, Canada, county seat of Hastings co., on the Bay of Quinte, Lake Ontario, 48 m. w. of Kingston, and 113 m. e. of Toronto; p. 12,206.

**Bellevue**, borough, Pennsylvania, Allegheny co., on the Ohio River, a residential suburb of Pittsburgh; p. 11,604.

**Belley**, town, department of Ain, France; it has an interesting cathedral, 18th century, and bishop's palace (1609); p. 5,308.

**Belligerent** is the term applied to a nation in a state of war. Its use marks an important distinction in international law between a *de facto* government at war and a subject state or race in rebellion, though in some instances, even when a nation is divided by internecine strife, recognition of the combatants as belligerents may become inevitable. A belligerent has the right to use every means which he

considers necessary to bring his enemy to terms. This broad and general right, however, is modified by the humane usage of nations, and by international compact.

**Bellingham.** See *Perceval*.

**Bellingham**, city, Washington, county seat of Whatcom co., on Puget Sound and Bellingham Bay, 100 m. n. of Seattle and 57 m. s. of Vancouver, B. C. It is the nearest American city to Alaska and enjoys the advantage of one of the finest land-locked harbors in the world. The city is notable for being the tulip center of the country; the experimental farm conducted by the U. S. government being located here. The city was formed by the Union of Whatcom and Fairhaven, Dec. 28, 1903; p. 34,112.

**Bellingham, Richard** (1592-1672), American colonial governor, was born in England, and went to America in 1634, being one of the original patentees of the Massachusetts colony. He was made deputy-governor in 1635, and governor for the first time in 1641, a position which he held continuously from 1665 until his death.

**Bellingshausen, Fabrian Gottlieb von** (1778-1852), Russian explorer and naval commander. He headed an expedition which sailed in 1819 for the Antarctic regions and discovered Traversay Island, Peter Island, and Alexander Land, bestowing on them their respective names. He subsequently received the command of the Russian fleet in the Baltic, and finally became military governor of Cronstadt. A report of his work of exploration appeared in 1831.

**Bellini, Gentile**, (? 1429-1507), Italian painter, eldest son of Jacopo Bellini, was probably born in Padua, and is believed to have settled in Venice about 1460. Among his finest works are *The Miracle of the Cross*, in the Academy at Venice, and *The Preaching of St. Mark*, in the Brera, Milan. Gentile's fame has been somewhat over-shadowed by that of his younger brother Giovanni, but during his lifetime he was probably considered the chief artist in Venice.

**Bellini, Giovanni** (c. 1431-1516), famous Italian artist, younger son of Jacopo Bellini, was born in Padua or in Venice. During the last years of his life he was surrounded by pupils and imitators, the most famous of whom are Giorgione, Titian, and Tintoretto. Bellini is probably the greatest Italian artist of the 15th century. Among his most famous works, several of which are in the National Gallery, London, are the *Transfiguration*; *Christ's Agony in the Garden*; and the *Coronation of*

*the Virgin*. The Metropolitan Museum, New York City, has one of his *Madonnas*. Consult Berenson's *Venetian Painters of the Renaissance*; Meynells' *Giovanni Bellini*.

**Bellini, Jacopo** (c. 1400-70), Italian painter, founder of the Venetian school of the 15th century, was born in Venice, the son of a tin-smith. Very little of his work has survived, the only authentic examples being a damaged *Madonna and Child* in the Venice Academy, a similar composition in the Tadini Collection at Lovere, and a *Crucifixion* in the Gallery at Verona.

**Bellini, Lorenzo** (1643-1704), Italian physician and anatomist, was professor of anatomy at Pisa and senior consulting physician to Pope Clement XI. He discovered the action of the nerves on the muscles and the uriniferous tubes, known as Bellini's tubes.

**Bellini, Vincenzo** (1802-35), Italian operatic composer, was born in Catania, Sicily, and studied at the Conservatorio, Naples. In 1831 he produced his most popular operas, *La Sonnambula* and *Norma*. See Brockway, Wallace, and Weinstock, H., *The Opera* (1941).

**Bellinzona**, town, Switzerland, capital of the canton of Ticino, on the left bank of the Ticino River; 20 m. n. of Lugano; p. 12,073.

**Bellite**, an explosive prepared from nitrate of ammonia and mono or di-nitro-benzene. It can be stored and transported with safety, not being exploded by a blow or by friction. It was discovered in 1886, and is said to be three times more powerful than ordinary gunpowder.

**Bellman, Karl Mikael** (1740-95), Swedish poet, was born in Stockholm. The best edition of his works is by Carlen (1881). Consult Erdmann's *Carl Michael Bellman*.

**Bell Metal**, an alloy used in the manufacture of bells. The usual composition is 75 parts of copper to 25 of tin, or 78 of copper and 22 of tin, although sometimes the alloy consists of copper, tin, zinc, and lead. A large percentage of copper gives a deep tone, but iron, zinc, and tin give a sharper ring.

**Bello, Francesco**, Italian epic poet (c. 1450-1505), known from his blindness as Cieco da Ferrara, lived at Mantua and Ferrara in great poverty. His poem *Mambriano* is one of the books which directly inspired the *Orlando Furioso* of Ariosto.

**Belloc, Hilaire** (1870-1953), English author, was born in France and was educated at Balliol College, Oxford, where he gained a scholarship in history. He served for a time in the French army and then entered the literary field, where he has achieved success as a magazine writer, historian, essayist, and novel-

ist. He served two terms in Parliament (1906-10). His books include *The Bad Child's Book of Beasts* (1896); *Danton* (1899); *Lambkin's Remains* (1900); *Robespierre* (1901); *Paris* (1912); *The Path to Rome* (1912); *The Book of the Bayeux Tapestry* (1913); *High Lights of the French Revolution* (1915); *Elisabeth, Creature of Circumstance* (1942).

**Bello** (or Belo) **Horizonte**, capital of Minas Geraes, Brazil, on slopes of Serra de Espinhaco, n.w. of former cap., Ouro Preto; 376 m. n.w. of Rio; p. 360,300.

**Bellona**, the Roman goddess of war, sister, wife or daughter of Mars. Her worship is possibly of Sabine origin, but her first temple at Rome was not founded until 296 B.C., in the Campus Martius. Consult Keightley's *Mythology of Ancient Greece and Italy*.

**Bellet, Joseph René** (1826-53), French naval officer and Arctic explorer, was born in Paris. He joined the British Arctic expedition in search of Sir John Franklin, in the course of which he reached the strait called by his name. Consult his *Journal* edited by Lemer (1854).

**Bellet Strait**, a narrow strait in the Arctic region between North Somerset Island and Boothia connecting the Gulf of Boothia and Franklin Channel, was discovered by Kennedy on the British expedition in search of Sir John Franklin, 1851, and named by him in honor of Lieutenant Bellet.

**Belotto, Bernardo**. See **Canaletto**.

**Bellows**, a mechanical device for producing a current of air. The usual form of bellows is a chamber formed of two pieces of wood generally heart-shaped, fastened together with a flexible band of leather and having a nozzle at one end and a valve in the lower board for the admission of air.

**Bellows, George Wesley** (1882-1925) American artist, was born in Columbus, Ohio. Bellows has been called the painter of democracy. Among his best known paintings are *On the Beach*, *The Circus*, *The River Front*, *The Polo Crowd*.

**Bellows, Henry Whitney** (1814-82), American clergyman, was born in Boston, Mass. He was graduated from Harvard (1832) and from the Cambridge divinity school (1837). He was founder and principal editor (1846-50) of the *Christian Inquirer*, a Unitarian weekly, and was on the staff of other religious papers.

**Bellows Falls**, village, Vermont, Windham co., on the Connecticut River, 80 m. s. of Montpelier. Paper and paper machinery are manufactured; p. 3,881.

**Bellou, Pierre Laurent Buirette de** (1727-75), French dramatist, a native of Auvergne,

entered the dramatic profession, and attained success as an actor in Russia. His collected works were published by Gaillard in 1779 and 1787, and a selection by Anger in 1811.

**Bell Ringing**. See **Bell**.

**Bell Rock**, or **Inchcape Rock**, a rocky reef, in the North Sea, off the coast of Forfarshire, Scotland, 12 m. s.e. of Arbroath, surmounted by a lighthouse 120 ft. high.

**Bells**, a nautical method of expressing the time of day. The twenty-four hours are divided into periods of four hours, each half-hour of these being represented by one bell. Thus, beginning at twelve o'clock, half-past twelve is 'one bell,' one o'clock 'two bells,' half-past one 'three bells,' two o'clock 'four bells,' continuing up to four o'clock, or 'eight bells,' when the round begins again.

**Bell-Smith, Frederick Marlett** (1846-1923), Canadian painter, born and educated in London. His pictures of the Northwest and Rocky Mountain scenes are of particular merit. He is known for his work in figure and portrait painting and for his landscapes.

**Bell's Palsy**, or **Paralysis**. See **Paralysis**.

**Bell-the-Cat**. See **Douglas**.

**Bell Tower**. See **Campanile**.

**Belluno**, province, Italy, in the northern part, lying between Tyrol and Venetia, with an area of 1,276 sq. m. It is almost entirely mountainous and is watered by the Piave; p. 228,714.

**Belluno**, (Rom. *Belunum*), city and episcopal see, Italy, capital of the province of Belluno, is situated on a lofty height overlooking the Piave; 72 m. n. of Venice; Belluno was the birthplace of Pope Gregory XVI.; p. 28,288.

**Bellwort**, small perennial herbs (*Uvularia*) of the order Liliaceae, found in Eastern North America. They have short creeping, fleshy rootstocks; slender stems; alternate leaves, oval, ovate, or lanceolate, with smooth margins; and drooping, bell-shaped flowers, with elongated perianth segments.

**Belmont, August** (1816-90), American financier, was born in Alzey, Germany. He was in the employment of the Rothschilds in Frankfort and Naples until 1837, when he became their agent in New York. Mr. Belmont was active in both social and political life in New York, and as a banker, he was prominent in many large railroad transactions and acquired a large fortune.

**Belmont, August** (1853-1924), American banker, son of August Belmont (1816-90), was born in New York City. On the death of his father, he became the head of the firm of

August Belmont and Company, and was a director in many corporations.

**Belmont, Perry** (1851-1947), American lawyer and politician, was born in New York, and was graduated (1872) from Harvard. He studied law at Columbia, and practised in New York until his election to Congress. Mr. Belmont was U. S. Minister to Spain, 1888-9, after which he resided in New York.

**Belmonte, Juan** (1893- ), Spain's greatest modern matador. He killed his first bull while still in his teens but remained in the ring long past the usual span of the bull fighter's career.

**Beloit**, city, Kansas, county seat of Mitchell co., on the Solomon River, 195 m. n.w. of Kansas City; p. 4,935.

**Beloit**, city, Wisconsin, Rock co., on Rock River, at the southern boundary of the State, 85 m. n.w. of Chicago. It is the seat of Beloit College. Industries include mills, foundries, and the manufacturing of agricultural implements, gasoline engines, windmills, paper, shoes, and scales; p. 29,590.

**Beloit College**, a non-sectarian educational institution founded in 1846, in Beloit, Wisconsin. Women were first admitted to the college classes in 1895.

**Belomancy**, divination by means of arrows. Nebuchadnezzar had recourse to this form of divination and it was in extensive use among the Arabians.

**Belon, Pierre** (1517-64), French naturalist, was born in Souletiere, near Mans.

**Belphoebe**, a character in Spenser's *Faerie Queene*, typifying Queen Elizabeth as the embodiment of womanly virtue and chastity.

**Belsham, Thomas** (1750-1829), English Unitarian divine. His published works include: *Memoirs of Theophilus Lindsey* (1812); *Letters to the Bishop of London in Vindication of Unitarianism* (1815).

**Belsham, William** (1752-1827), English political writer and historian, brother of Thomas Belsham, devoted his life to the promotion of Whig doctrines. His historical works were reissued in 1806 in 12 vols., under the title *History of Great Britain to the Conclusion of the Peace of Amiens*.

**Belshazzar**, a Babylonian prince. The book of Daniel (v.) makes him the son of Nebuchadnezzar, and the last Chaldaean king of Babylon, and relates the story of the feast at which he was warned of the impending fate of his kingdom by a mysterious writing on the wall. Cuneiform inscriptions discovered in 1854 would indicate that Belshazzar was the eldest son of Nabonidos, that he was in command of

the Babylonian army, and though not himself king, was the last great defender of the Babylonian monarchy. Consult *Commentaries* on the Book of Daniel.

**Belt, Great**, a strait between Zealand and Funen, Denmark, the middle channel connecting the Baltic and the Kattegat.

**Belt, Little**, strait between Jutland and Funen, the west channel connecting the Baltic and the Kattegat.

**Belt and Rope Transmission.** Power developed by a prime mover can rarely be used directly; it must be transmitted, in many cases, to a considerable distance from its source. Belting, running upon pulleys, is a means for such transmission universally in use. Belts are of two general classes: leather and fabric. The fabric belts are mostly of a cotton base, treated with various substances— asphalt, rubber, balata, etc. In a class by itself is the camel's-hair belt. Steel belts have had so far a limited use. The rope used in power transmission is of cotton or manila.

First-quality belts are made exclusively of oak-tanned hides of steers; only the central part of the hide, is considered good enough for the best belts. Leather belts are of one, two, or three ply; and some three-ply belts have the middle layer of rawhide, which is about three times stronger than leather and much more pliable. The joining of leather belts is commonly by lacing; the ends being scrupulously squared and the edges being drawn close together with rawhide lacings run through holes punched not less than half an inch back for narrow belts and further for wide belts. Patent metal clasps are also in use.

There are three types of fabric belts having cotton as a basis: solid-woven, canvas, and rubber or balata. Solid-woven belts are woven directly to the required thickness. Canvas belts are made by stitching together several layers of canvas, as many as 12 in some cases. Rubber and balata belts are made up of layers of canvas with rubber or balata gum in between.

Rubber belts are preferred when the belt is exposed to the weather or to steam. Balata belts have a superior grip on pulleys, require no dressing, and do not deteriorate with age. Camel's-hair belts are woven solid. They have a high co-efficient of friction.

Steel band belts are made from a specially prepared charcoal steel, rough-rolled when hot, and brought to the required thickness and width by cold working.

Belts are rated by the manufacturer as capable of transmitting a certain horsepower.

**Beltane**

These ratings are calculated on driving and driven pulleys of the same diameter, and an arc of belt contact of  $180^\circ$ .

The tension of a belt should be just sufficient to prevent loss of power through slip. To strain a belt tighter than this is to shorten its life, cause hot bearings, and increase wear of the bearings. The tension when the belt is at rest should be close to 100 pounds per inch of width.

The life and efficiency of belts depend largely on the size of the pulleys, which should be as large as space permits without raising the belt velocity to more than 4,500 ft. per minute. Wood pulleys afford a better grip than either cast-iron or steel pulleys.

Critical speed is reached for most belts at 5,000 ft. per minute; above that the slip is so great that the power transmitted is lessened. For rubber belts the speed should be held down to below 4,000 ft. per minute.

The flesh side of a leather belt should not be run next the pulley face. When a belt is new, the flesh side gives the best traction for a few days, but later transmits only 60 per cent. as much as the hair side. A four-ply rubber belt is equivalent to a single leather belt; a six-ply thickness to a double leather belt. A leather belt will save its cost above a rubber belt in three years.

Cotton ropes are used almost altogether in rope drives, manila fibers being too stiff and brittle for long wear and requiring frequent stoppages to take up slack. The ropes are run on pulleys with grooved faces; the size of the rope determines the size of the groove, but the angle is always at  $40^\circ$ .

Two systems are employed: the multiple, and the continuous. In the former each rope on a pulley forms an independent belt; in the latter only one rope is used, and it is carried continuously around all the pulleys, with but one splice.

**Bibliography.**—Consult R. T. Kent's *Power Transmission by Leather Belting* (1916), F. V. Hetzel's *Belt Conveyors & Belt Elevators*.

**Beltane**, **Belltaine**, or **Beltine**, a word found in Scotland, Ireland, Cumberland, and Cornwall, applied in a secondary sense to the first of May (or, in some districts, to St. John's Eve and St. Peter's Day), but originally used to denote the great fire festivals which marked the beginning of summer. The Beltane rites continued to linger on into the 19th century in certain parts of the British Isles.

**Beltrami**, **Eugenio** (1835-1900), Italian mathematician, was born in Cremona and taught mathematical physics in the University

of Rome and other Italian universities. He is remembered for the important departures which he made in the study of geometry.

**Beluchistan**. See **Baluchistan**.

**Beluga**, or **White Whale** (*Delphinapterus leucas*), a cetacean allied to the dolphins, and especially to the narwhal (q.v.). The beluga is from eight to ten ft. in length, is white in color, and is found in the Arctic seas, but occasionally strays southward.

**Belur-tagh**, or **Bolor-tagh**. See **Pamirs**.

**Belus**, in Greek mythology, son of Poseidon and Libya, and father of Ægyptus and Danaus. He was supposed to have founded Babylon.

**Belvedere**, a summer-house or kiosk on rising ground, or a room built above the roof of a house for the purpose of viewing the surrounding country. In France the term is also used for a summer-house in a garden. Two important structures are known by this name—the Court of the Belvedere in the Vatican, which forms part of the sculpture gallery, and a palace near Vienna, built in 1725 for Prince Eugene of Savoy.

**Belvidere**, city, Illinois, county seat of Boone co., on the Kishwaukee River, 75 m. n.w. of Chicago; p. 9,422.

**Belvisia** (*Napoleona imperialis*), an African plant closely allied to the mangrove, with flowers of a brilliant red, blue, or white color, and an edible fruit resembling the pomegranate.

**Belvoir Castle**, Leicestershire, England, the seat of the Duke of Rutland. The original building was a fortress, erected soon after the Conquest by Robert de Todeni.

**Bemba**, lake. See **Bangweolo**.

**Bembex**, a genus of hymenopterous insects specially notable for their burrowing propensities, generally known as 'sand wasps.' They are found chiefly in warm climates, where they infest sandy banks, on which the females deposit their eggs, provide food for the larvae, and then close up the holes with earth.

**Bembridge Beds**, a division of the Oligocene or Upper Eocene strata, principally developed in the Isle of Wight and in Hampshire, England.

**Bemidji**, city, Minnesota, county seat of Beltrami co., on Bemidji Lake, and 200 m. n.w. of Minneapolis; p. 10,001.

**Bemis**, **Edward Webster** (1860-1930), American economist and appraisal engineer, was born in Springfield, Mass., and was educated at Amherst College.

**Bemis Heights**, **Battle of**. See **Saratoga**, **Battles of**.

**Ben** (Hebrew and Arabic 'son'), often used



*Scene in Benares.*

in connection with the father's name to form personal names and patronymics—thus, Ali-Ben Hassan, 'Ali, son of Hassan'; Benoni, 'son of my pain'; Benjamin, 'son of the right hand.' The Arabs, Persians, and Turks often make the prefix into *Ibn* (*Ebn*); the Jews, under Arabic influences, use *Aben*, *Aven*, as in Aben Esra.

**Ben**, or **Beinn**, the Gaelic form (Welsh *Pen*) of a Celtic word signifying 'mountain' or 'mountain head.'

**Benacus Lacus**. See **Garda**.

**Benadir**, administrative division of Italian Somaliland, East Africa, extending from the Juba north to Meghed. It is officially known as Southern Italian Somaliland.

**Benalla**, town, Victoria, Australia, in Delatite co.; 110 m. n.e. of Melbourne; p. 3,100.

**Benares**, native state, United Provinces, India, formed in 1911 from the parganas of Bhadohi and Kera Mangraur and the tract comprising the Fort of Ramnagar and its appurtenances. Area, 870 sq. m.; p. 255,744.

**Benares** (*Banaras*), the most sacred city of the Hindus, and one of the principal towns of the United Provinces, India, is situated on the left bank of the Ganges; 429 m. n.w. of Calcutta, with which it is connected by rail. It skirts the Ganges for 3 m., and the high bank is lined with broad flights of stairs or *ghats*, leading to innumerable temples.

Notable buildings are the Nepalese temple, Aurungzebe's mosque, with two minarets 147 ft. high; the Gopal Mandir, wealthiest of all the temples; the Bisheswar or Golden Temple of Siva, the holiest of all; and the famous Durga Temple, popularly called the Monkey Temple. At the Burning Ghat the bodies of Hindus are reduced to ashes. Benares draws immense revenues from the thousands of pilgrims who visit it from all parts of India.

A city of great antiquity, Benares (Sanskrit *Varanasi*) was for 800 years the center of the Buddhist faith. In the 4th century B.C. it reverted to the ancient faith of the Hindus, of which it has ever since been the metropolis; p. 355,777. Consult Rajani Rangan Sen's *The Holy City* (1912).

**Benbecula**, an island of the Outer Hebrides. See **Hebrides**.

**Benbow, John** (1653-1702), British admiral, was born in Shrewsbury, England, and first distinguished himself as captain of a merchantman in a bloody action with Sallee pirates (1686). In 1696 he became rear-admiral, and in 1698 took command of a force in the Channel. In 1699, he commanded in the West Indies. On his return to England, the

following year, he was appointed vice-admiral.

**Bench**, a collective term for the judiciary, as in the phrase 'bench and bar,' to denote the judges and practising lawyers of a given jurisdiction. Specifically, the term is also in use to designate a judge, or, more commonly, a court composed of several judges acting together, as in the phrases the 'supreme bench,' the 'circuit bench,' the 'full bench.'

**Benchley, Robert Charles** (1889-1945), American humorist, was born in Worcester, Mass.; educated at Harvard; dramatic editor of *Life* (1920-29); of *The New Yorker* (1929-40); actor in motion picture plays.

**Benckendorff, Count Alexandre** (1849-1917), Russian diplomat, was educated in Paris and entered the diplomatic service as an attache in Italy. He had a large share in realizing the Triple Entente.

**Bencoolen**, or **Benkulen** (Dutch *Benkeulen*), seaport town, Indonesian Republic, on west coast of Sumatra. Fort Marlborough, the residence of the governor, was erected in 1714; p. 13,418.

The Residency of Bencoolen stretches along the Sumatran coast, and embraces an area of 9,995 sq. m., with a population of over 200,000.

**Bend**, in heraldry one of the honorable ordinaries, is a figure with parallel edges, extending diagonally right across the shield from the dexter chief to the sinister base. The *bend sinister* is the bend dexter reversed—sloping from the sinister chief to the dexter base. See **HERALDRY**.

**Bender**, or **Benderi**, town, Rumania, in Bessarabia, on the River Dniester, 62 m. n.w. of Odessa; p. 25,000.

**Bender Abbas**, or **Bandar Abbas** (formerly *Gombrun* or *Gombroon*), seaport, Iran, in the province of Kerman, on the north side of Ormuz Strait; 12 m. n.w. of Ormuz; p. 7,000.

**Bender Gez**, seaport, Iran, in the province of Astrabad, is situated at the s.e. corner of the Caspian Sea; 20 m. w. of Astrabad.

**Bendigo**, (formerly *Sandhurst*), Victoria, Australia, capital of Bendigo county, and chief town of a large district devoted to gold mining and farming; 101 m. by rail n.w. of Melbourne; p. 31,610.

**Bendire, Charles Emil** (1836-97), American ornithologist, was born near Darmstadt, Germany. He went to America in 1852, and, after serving in the Civil War, he devoted himself to ornithology, and made a large collection of nests and eggs, now in the U. S. National Museum. His chief work, *The Life*

*Histories of North American Birds* (1892-6), was left unfinished.

**Bonds.** See **Caisson Disease**.

**Bondzin**, town, Poland, in the government of Piotrkow; 100 m. s.w. of Lodz; p. 46,000.

**Benedetti, Vincent, Count** (1817-1900), French diplomat. He drew up the draught of a secret treaty between France and Prussia in 1870; and demanded of King William a guarantee that no Hohenzollern prince should accept the Spanish crown, thus playing an important role in the Franco-German War (q.v.). In *Ma Mission en Prussia* (1871) and *Studies in Diplomacy* (Eng. trans.) he defends his own policy.

**Benedicite**, or the Song of the Three Children, a canticle from the Apocrypha, is used in the Anglican Church at the morning service when the Te Deum is not sung.

**Benedict**, the name of fifteen popes and one anti-pope.

**BENEDICT VIII.** (1012-24), distinguished himself as a reformer of the clergy, and interdicted clerical marriage and concubinage.

**BENEDICT IX.**, a nephew of Benedict VIII., obtained the papal throne by simony in 1033. He was several times deposed and reinstalled.

**BENEDICT XIII.** is a title assumed by two popes, *Peter de Luna*, recognized only by Spain and Scotland up to his death in 1424; and *Vincenzo Marco Orsini* (1724-30).

**BENEDICT XIV.** (1740-58) (Prospero Lambertini), revived the academy of Bologna and encouraged literature and science.

**BENEDICT XV.** (1914-22) (Giacomo Della Chiesa) held his position in critical years. He made repeated efforts to end the war. He sent Monsignor Cerratti as an observer at the Peace Conference and after the Treaty of Versailles declared that as the head of the Church he would do all in his power to support the decisions of the delegates. His influence was constructive, and in 1919 he freed Italian Catholics from all inhibition against participating in political movements.

**Benedict, St.** (480-543), founder of Western monasticism. At fourteen he retired to a deserted country lying on a lake, where, in a cavern (which afterward received the name of the Holy Grotto), he dwelt for three years, until his fame spread over the country. He was appointed abbot of a monastery, but left it for a stricter mode of life. He influenced sons of wealthy Romans and uncivilized Goths, and he was able to found monasteries. He founded the monastery of Monte Cassino, near Naples, which became one of the richest and most famous in Italy. In 515 he wrote his

*Regula Monachorum*, introducing sterner discipline, which eventually became the standard rule of the Western monastic orders.

**Benedict, Sir Julius** (1804-85), musician and composer. Conductor at Vienna (1824) and Naples (1826), at Covent Garden, Drury Lane, 1835, and various musical festivals. In 1850-51 he acted as concert director during a successful tour of the United States by Jenny Lind. His *Lily of Killarney*, first given in 1862 at Covent Garden, was his greatest operatic success. The fine oratorio, *St. Peter*, is considered his masterpiece. He was knighted in 1871.

**Benedictine.** See **Liqueurs**.

**Benedictines**, an order of monks and nuns who follow the rule of St. Benedict (q.v.). In the 15th century there were 15,107 Benedictine monasteries.

The Rule of St. Benedict was the first to introduce *Stability*, or the binding of the monk to a permanent abode and in the practice of monastic life till death—the first of the three vows; the second is *Conversion of Manners*—i.e., the striving after perfection of life; and the third, *Obedience according to the Rule*, by the tenor of which the monk is bound to chastity, renunciation of private property, retirement from the world, solemnization of the divine office, and to a life of frugality and labor under the abbot.

The Benedictine habit's color is not specified in the rule. For many centuries, however, black has been the prevailing color, whence the term 'black monk' has come to mean a Benedictine in general. Consult Cardinal Newman's *Mission of St. Benedict*; Montalembert's *Monks of the West* (Eng. trans. by Gasquet).

**Benediction**, a solemn invocation of the divine blessing upon men or things. In the Protestant churches the Benediction is pronounced by the minister at the close of divine service. In the Roman Catholic Church a priestly benediction has been defined as a formula which transmits a certain grace or virtue to the object over which it is pronounced. Priests having special faculties for the purpose may bless crosses and rosaries, which only, when so blessed, impart the papal indulgence to those who use them.

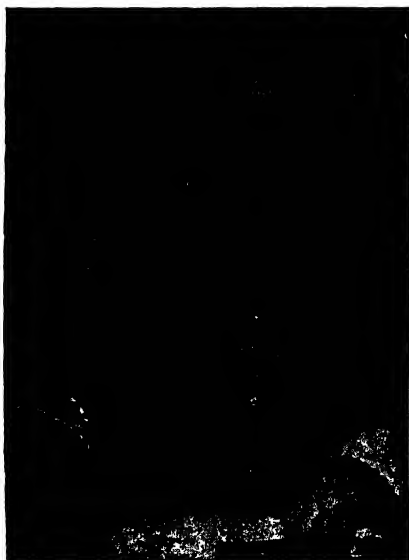
**Benefice**, the term applied to an ecclesiastical living in the Church of England. In feudal law the term was employed in a wider sense to include any gift of lands made by a lord to his vassal, to be held by the latter on condition of military or other service.

**Beneficiary**, strictly, the holder of a benefice; in the law of trusts, the person for whose



benefit the trust fund is created. Also, the person entitled to the benefits of a policy of life insurance.

**Benefit of Clergy**, a privilege claimed by the mediaeval church, whereby the clergy, when charged with crime, were permitted to stand trial in ecclesiastical rather than secular courts. In England this privilege was ex-



*Pope Benedict XV.*

tended in 1330, to include all persons who could read, *i.e.* to all 'clerks.' At the beginning of the 16th century it was enacted that certain offenses should be 'without benefit of clergy'; and in 1827 the privilege was abolished. In America it was forbidden by Act of Congress.

**Benefit Societies.** See **Fraternal Societies.**

**Benke, Friedrich Eduard** (1798-1854), German philosopher, was born in Berlin, and succeeded Hegel as professor of philosophy there. 'Theory of Knowledge' (1820), in which he opposes the philosophy of Hegel and Kant, shows a strong sympathy with the Scottish metaphysicians. In his view the basis of all philosophy consists in empirical psychology.

**Benes, Eduard** (1884-1948), Czechoslovakian President, worked his way through the University of Prague, and studied also in France. After the outbreak of World War I he organized an underground society working in the interest of the Allies, and joining Pro-

fessor Masaryk in Paris, organized with him the Czechoslovak National Council. When the Czechoslovak Republic was proclaimed (1918), Benes was made foreign minister. He was also a member of the Peace Conference. He continued as foreign minister until 1935, when he became president; resigned 1938; later came to U.S. and taught at the Univ. of Chicago. In 1939 became head of the Czechoslovak National Committee, the government-in-exile, at Paris; in 1944 went to London; in 1945 ended exile and returned to set up new Czech government in Kosice; he was opposed by the London Czechs. He wrote *Bohemian Case for Independence* (1917), *My War Memories* (1928) and other books.

**Benét, Stephen Vincent** (1898-1943), American author, born in Bethlehem, Pa. Among his writings are: *John Brown's Body* (Pulitzer Prize, 1928); *The Devil and Daniel Webster* (1937); *Western Star* (1943).

**Benét, William Rose** (1886-1950), American poet and editor, brother of Stephen Benét, asst. ed. *The Century* (1911-18); an editor of *Saturday Review of Literature*. His works include *The First Person Singular* (1922); *Wild Goslings* (1927); *Rip Tide* (1932); also essays, poems and children's stories; edited poems of Elinor Wylie.

**Benevento**, city and archi-episcopal see, Italy, capital of the province of Benevento; p. 50,016.

**Bengal**, former province of British India, constituting, since 1912, the Presidency of Bengal. Bengal is rich in minerals; diamonds have been found in the bed of the Mahanadi River. Agriculture is the most important industry. In 1947 divided into East Bengal, now part of Pakistan, and West Bengal, part of the Union of India; p. (1941) 60,306,525.

**Bengal, Bay of**, an extension of the Indian Ocean, between India on the w., and Burma and the Malay Peninsula on the e.

**Bengali Language and Literature**, Bengali language, one of the chief dialects of India, spoken by more than forty million people, is derived from Sanskrit. Bengali literature, properly speaking, began in the 14th century with imitations of the songs of Jayadeva, who flourished in the 12th century. Chandi Das is the earliest vernacular poet of Bengal. He lived in the 14th century and has immortalized the washerwoman Rami in his songs of love.

The most important writer of the 20th century is Sir Rabindranath Tagore (q.v.), who was awarded the Nobel prize in literature in

1913. Consult Anderson's *Manual of the Bengali Language* (1920).

**Bengal Lights**, colored fires, used as signals and in pyrotechny.

**Benguet**, province, Luzon, Philippine Islands; p. 115,339.

**Ben Gurion, David** (1886- ), Jewish statesman, born at Plonsk, Poland, educated at Univ. of Constantinople. Moved to Palestine; exiled 1915. Chairman of Board, Jewish Agency for Palestine (1947- ); Premier of Israel (1948-53, 1955- ).

**Benhadad**, the name given in the Old Testament to three (or two) kings of Damascus—i.e. Syria.

**Benham, Andrew Ellicott Kennedy** (1832-1905), American naval officer. In 1894 he obliged the insurgent squadron at Rio de Janeiro, Brazil, to raise their blockade, and cease firing upon American merchant craft.

**Beni**, or **Paro**, river, Bolivia. See **Amazon**.

**Beni**, a department of Bolivia, in the n.e. part; p. about 119,770.

**Benicia**, seaport city, California; p. 7,284.

**Beni-Hassan**, village, Egypt, on the right bank of the Nile; p. 1,300.

**Benin**, province, town, and river in the Southern Province of the British Protectorate of Nigeria. The city of Benin is 75 m. inland; p. 5,000.

**Benin, Bight of**, a division of the Gulf of Guinea.

**Beni-Suaf**, town, Upper Egypt, capital of the province of the same name (p. 452,893); p. 56,356.

**Benjamin** ('son of the right hand' or 'of the south'), the youngest son of the patriarch Jacob, and the 'eponymous' ancestor of the tribe of that name. The prophet Jeremiah and the apostle Paul were of the tribe.

**Benjamin, Judah Philip** (1811-84), American Confederate leader, was born of English-Jewish parentage on St. Croix, W. I. He settled in New Orleans, became a member of the U. S. Senate, was prominent as a debater on the Southern side. He resigned in February, 1861, and was a member of President Davis' cabinet, 'the brains of the Confederacy'. Upon Lee's surrender he became one of the most successful lawyers in Great Britain. His work, known as *Benjamin on Sales*, is a classic.

**Benjamin, Marcus** (1857-1932), American scientist and editor. He was a member and officer in many learned societies and contributed largely to scientific and other periodicals. In 1896 he became editor at the U. S. National Museum, Washington, D. C.

**Benjamin, Park** (1809-64), American journalist. He edited the *New England Magazine*, 1835-7; assisted Horace Greeley on the *New Yorker*; was associated with other journalistic ventures and author of many books.

**Benjamin, Samuel Greene Wheeler** (1837-1914), American author and diplomat. He was U. S. minister to Persia (1883-5).

**Benjamin-Constant**. See **Constant**.

**Ben Lomond**, mountain, (3,192 ft.), Scotland, on the e. side of Loch Lomond.

**Ben Macdhu**, mountain (4,296 ft.) in Aberdeenshire, Scotland.

**Ben More**, mountain (3,843 ft.), Scotland, 1 m. from the head of Loch Lomond.

**Benmore Head**. See **Fair Head**.

**Benne Oil**, an oil obtained from the seeds of *Sesamum indicum*. Its uses are similar to those of olive oil.

**Bennett, (Enoch) Arnold** (1867-1931), English novelist. He entered a lawyer's office in London, but abandoned law for editorial work. In 1900 he resigned and devoted himself to writing. His best works are his series of novels portraying life in the Five Towns, *Anna of the Five Towns*, *The Old Wives Tale*, *Clayhanger*, *Hilda Lessways*, and *The Mator of the Five Towns*. He is known for his psychological studies of commonplace people. Among his many other works are *How to Live on Twenty-four Hours a Day*, *Lord Raingo*, *Buried Alive*, *A Great Man*, *Riceman Steps*, *Imperial Palace*, *Books and Persons*. Consult *The Journal of Arnold Bennett* (1932-33).

**Bennett, Constance** (1908- ), American actress, born in New York City and educated in private schools. Became film actress (1924) and starred in many pictures. Later was designer of Constance Bennett frocks.

**Bennett, Floyd O.** (1890-1928), aviator who piloted Commander Richard E. Byrd over the North Pole in 1926, accompanied Byrd on expedition to Greenland, 1925; was injured in test flight before Byrd's transatlantic flight in 1927, and was not a member of that expedition. In 1928 while flying to the rescue of the crew of the transatlantic airplane Bremen which landed on Greenley Island, Canada, he contracted pneumonia and died. Floyd Bennett Field, a New York airport, is named in his honor.

**Bennett, James Gordon** (1795-1872), American journalist, was born in Newmills, Banffshire, Scotland, settled at Halifax, but removed to Boston and New York (1822), where he began to write for the press. He was variously occupied as proof-reader, reporter, correspondent and editor for different papers.

He originated the idea of the *New York Herald*, published the first number May 6, 1835, introduced many novel features such as financial articles, telegraphed transmission of speeches, extra staff correspondents; he gained for his paper a large circulation.

**Bennett, James Gordon** (1841-1918), American journalist and yachtsman, proprietor of the *New York Herald*, directed its policies and conduct by cable from Paris. He issued a Paris edition. He took an active interest in yachting, and later he became interested in automobiling and aeronautics.

**Bennett, John Hughes** (1812-75), English physician and physiologist.

**Bennett, Richard** (1872-1944), American actor-producer, b. in Indiana; father of Constance and Joan Bennett, motion-picture actresses. He starred in many plays.

**Bennett, Richard Bedford** (1870-1947), Canadian statesman. In 1917, Director-General of National Service; in 1921, Minister of Justice; in 1926, Minister of Finance; 1930-1935, Premier of the Dominion of Canada.

**Bennett, Sir William Sterndale** (1816-75), British composer and pianist. He became principal of the Royal Academy in 1868, and was knighted in 1871. Among his more noteworthy works are the overtures *Tempest* (1832) and *Merry Wives of Windsor* (1833).

**Ben Nevis**, mountain (4,406 ft.), in Invernesshire, Scotland.

**Bennigsen, Levin August Theophil, Count** (1745-1826), Russian general. He defeated Murat at Tarutino, and (1813) shared in the famous victory of Leipzig.

**Bennington**, village, Vermont, county seat of Bennington co. A monument 300 ft. in height commemorates General Stark's victory on Aug. 16, 1777; p. 8,002.

**Bennington, Battle of**, a battle of the American Revolution, fought at Bennington, Vt., Aug. 16, 1777, under General Stark. The British forces were defeated.

**Ben-nut Tree** (*Moringa pterygosperma*), a tree belonging to a small order of plants found in Arabia and East Indies.

**Benny, Jack** (1894- ), radio comedian, was born in Waukegan, Ill. The radio program on which he stars was considered one of the most popular programs on the air. He first appeared in the movies in 1929 and has been starred in several movies including *Hollywood Revue of 1929*, *It's in the Air* (1935), *Broadway Melody of 1936*, *College Holiday* (1936), and *The Big Broadcast of 1937*. His real name is Benjamin Kubelsky.

**Benoit, de Sainte-More**, or **Maure**, French troubadour of the 12th century. His *Roman de Troie* enjoyed great popularity in the Middle Ages.

**Benson, Arthur Christopher** (1862-1925), English author, was educated at Kings College, Cambridge. His writings include: *From a College Window* (1902); *Beside Still Waters* (1907); a number of biographies.

**Benson, Edward Frederic** (1867-1940), English novelist, third son of Archbishop Benson. He was connected with the British Archaeological School in Athens (1892-5), and with the Hellenic Society in Egypt (1895). His works include *Dodo* (1893); *Dinner for Eight* (comedy, 1915); *Crescent and Iron Cross* (1918); *Our Family Affairs* (1920); *Dodo Wonders* (1921); *Paying Guests* (1929).

**Benson, Edward White** (1829-96), Archbishop of Canterbury. His *Life of Cyprian* (1897) and *The Apocalypse* (1906) were published posthumously.

**Benson, Frank Weston** (1862- ), American painter. He is known chiefly as a painter of women and children, and of out-of-door studies.

**Bent, James Theodore** (1852-97), English author and traveller. The results of Bent's explorations appear in *The Ruined Cities of Mashonaland*; *The Sacred City of the Ethiopians*; and *Southern Arabia*.

**Bent, Silas** (1820-89), American naval officer, particularly distinguished as a meteorologist and hydrographer. He served as a captain in Perry's famous expedition to Japan (1853-4), and is remembered chiefly as the first scientific writer to describe fully (1855) the Japanese Current or Kuro Shiwo.

**Bent Grass**, a genus of grasses (*Agrostis*) including nearly a hundred species widely distributed over the globe.

**Bentham, George** (1800-84), English botanist, nephew of Jeremy Bentham. His greatest achievement is the epoch-making *Genera Plantarum* (3 vols., 1862-83) written with Sir Joseph Hooker.

**Bentham, Jeremy** (1748-1832), one of the most influential English writers on politics and jurisprudence, was the son of a prosperous London attorney.

On the outbreak of the French revolution Bentham enthusiastically and voluntarily advised the revolutionists; when he visited Paris in 1823, he was received with honor. Consult Stephen's *English Utilitarians*; Atkinson's *Jeremy Bentham: His Life and Work*.

**Bentinck, Lord William Cavendish** (1774-1839), governor-general of India, son of the 3d Duke of Portland. He was governor of Bengal in 1827, and from 1828 to 1835 was governor-general of India. His administration was marked by opening to the natives a larger share in the government of India.

**Bentinck, Lord William George Frederick Cavendish** (1802-48), son of the 4th Duke of Portland, in 1845 headed the Protectionist party in the defeat of Sir Robert Peel.

**Bentley, Richard** (1662-1742), English scholar and divine. In 1700 he was appointed master of Trinity College, Cambridge, and in 1717 regius professor of divinity. Consult his *Remarks upon a late Discourse of Free Thinking* (1712), and *Eight Sermons preached at the Hon. R. Boyle's Lectures* (1724). Consult *Monk's Life*; and R. C. Jebb's *Bentley*, in the 'English Men of Letters' series.

**Benton, James Gilchrist** (1820-81), American soldier. He invented many appliances for artillery.

**Benton, Thomas Hart** (1782-1858), American statesman. In 1812 he commanded a regiment under Jackson, with whom he was to be closely associated in future years. He was also the principal supporter in the Senate of President Van Buren. Subsequently he served one term (1853-5) in the House of Representatives, bitterly opposing the Kansas-Nebraska Bill. It was chiefly after retirement that he prepared his *Thirty Years' View; or a History of the Working of the American Government 1820-50* and his *Abridgement of the Debates of Congress 1789-1856*, both works of great value. Consult *Lives* by Roosevelt, Mcigs, and Rogers.

**Benton, Thomas Hart** (1889- ), American painter and draughtsman, was born in Neosho, Mo. He was educated at the Chicago Art Institute, and in 1908 went to Paris for a year of study. While abroad he came under the partial influence of the French neo-classic forms of painting, and translated classical works into geometric figures. He contributed essays on Cubism for *The Arts* magazine. He was in the American naval service during the war, after which he toured America seeking for his paint brush a cross section of American types. His paintings represent the American scene, particularly his murals which are owned by the New School for Social Research and the Whitney Museum. In 1931 he painted murals in the Missouri State Capitol which caused wide discussion.

**Benue, or Binue, river**, West Africa.

**Benvenuto**, properly **Tisio da Garofalo** (1481-1559), Italian painter, last of the Ferrara school, called 'the miniature Raphael.'

**Benzacoinine**, an alkaloid formed by the partial hydrolysis of aconitine.

**Benzaldehyde**. See **Almonds, Oil of**.

**Benzene**, or **Benzol** ( $C_6H_6$ ), a light (sp. r. .88), colorless, mobile liquid with a peculiar odor. Chemically it is a hydrocarbon in which six carbon atoms are symmetrically arranged in a ring, one hydrogen atom being attached to each carbon atom. Benzene is obtained from coal tar (q.v.), being separated in the first place by fractional distillation, which, however, does not yield an entirely pure product. It is the parent substance of the aromatic series of organic compounds, yielding many derivatives by the substitution of alkyl and other groups for the hydrogen atoms. Of these, nitro-benzene and aniline are among the more important. Benzene derivatives are largely employed in the color industry (see **COAL-TAR DYES**).

**Benzidine**, ( $NH_2.C_6H_4.C_6H_4.NH_2$ ), a derivative of benzene.

**Benzine**, or **Benzoline**, a mixture of the lower boiling paraffin hydrocarbons, known also as petroleum spirit or petroleum naphtha, obtained by the distillation of crude petroleum. It is not to be confused with benzene or benzol. It is used as a cleaning fluid, as an ingredient of varnishes, for enriching coal gas, and for other purposes.

**Benzoate of Soda**, a sodium compound,  $C_6H_5.CO_2Na$ , sometimes used as a food preservative.

**Benzoic Acid** ( $C_6H_5.COOH$ ), an aromatic acid, occurring in gum benzoin, storax, and Peru and Tolu balsams. It acts as an antiseptic and expectorant, though the acid itself and its salts are antipyretic.

**Benzoin, Gum Benzoin, or Gum Benjamin**, a balsamic resin, obtained from *Styrax benzoin*, a thick-stemmed tree of Java and Sumatra. It is used in medicine and in the manufacture of perfumery and incense. The official preparations are the tincture and compound tincture.

**Benzoline**. See **Benzene**.

**Benzyl Chloride**, ( $C_6H_5.CH_2Cl$ ), a compound obtained by passing chlorine into boiling toluene.

**Beograd**. See **Belgrade**.

**Beöthy, Zoltan** (1848-1922), Hungarian author. He became professor (1882) of the fine arts at Budapest University, and published a number of meritorious novels.

**Beowulf**, the earliest English epic poem. It was probably composed in the latter part of the 7th century, but the date, and still more the place of action, is matter of discussion. The single ms. is in the British Museum. It is in West Saxon dialect; but most scholars hold it to be a transcription from a northern or midland dialect. The text of the poem has been edited by Zupitza (Early English Text Society) and by Wyatt. There are translations by William Morris and Wyatt, and by Dr. Clark Hall.

**Bequest**, a testamentary gift of personal property. The term is, however, used to denote any gift by last will and testament.

**Berabra**, a Nubian people living on both banks of the Nile.

**Béranger, Pierre Jean de** (1780-1857), the greatest of French song writers. Such songs as the world-renowned *Petit homme gris* were succeeded in 1813 by *Roi d'Yvetot*, which first made its author popular. In 1815 appeared *Chansons morales et autres*, including the patriotic pieces, *Les enfants de la France*, *Le Cinq Mai*, *Le vieux drapeau*, and other songs full of biting sarcasm and bitter hostility to the priests and reactionaries. In 1825 he published *Chansons nouvelles*, and in 1828 *Chansons inédites*, for which he was tried, fined 10,000 francs, and condemned to nine months' imprisonment in La Force, where he was visited by Hugo, Dumas, Sainte-Beuve, and others. Consult his *Ma biographie* (1857); Janin's *Béranger et son Temps*; W. H. Pollock's *French Poets*.

**Berar**. See **Haidarabad**.

**Berberidaceæ**, an order of 135 species of plants, placed between the buttercup and laurel orders, and found in temperate regions of both hemispheres. Common barberry, (*Berberis vulgaris*) is found in Europe, Asia, and North America.

**Berbers**, a people of Hamitic race ranging over North Africa southwards to the Senegal. Till the ingress of the Arabs in the 1st and 2d centuries the Berbers had Mauritania for their exclusive habitat. The Moslem invasions drove them inland into the Atlas Mountains and they have been largely assimilated with the kindred Arabs. They include the Kabyles of Algeria and Morocco; the Shellala (Shuluhs) of the upland Atlas valleys; the Haratin (Black) Berbers of the south Atlas slopes; and the Saharan Tuaregs.

**Berbice**, a division in the eastern part of British Guiana, drained by the Berbice River. p. about 60,000.

**Berceuse**, ('cradle song'), a melody with a lulling, rocking accompaniment.

**Berchem**, or **Berghem**, properly **Nikolaas** (or **Claas**) **Pieterz** (1629-83), Dutch painter. Though he lived in Holland he generally painted Italian scenery and excelled in sunny atmospheric effects.

**Berchet, Giovanni** (1783-1851), Italian poet. His works were collected by F. Cusani (1863).



tume.

**Berchta**, **Bergda**, or **Bertha**, a female being in Teutonic tradition, whose fete-day occurs on or about Epiphany; described as a shaggy monster. She rules over nighthags, enchantresses, elves, dwarfs, and the souls of unbaptized children.

**Berchtold, Leopold Anthony, Count von** (1863-1942), Austrian statesman. He was am-

bassador at St. Petersburg in 1905-11 and in 1912-15 was foreign minister of Austria-Hungary. He signed the 1914 ultimatum to Serbia. After the fall of the royal house he retired from politics.

**Berdichev**, town, U.S.S.R., in the Ukraine; the site of the ancient monastery of the 'Barefooted Carmelites'; p. 66,306.

**Berea**, town, Kentucky. It is the seat of Berea College (q.v.); p. 3,372.

**Berea College**, a non-sectarian institution in Berea, Kentucky, founded in 1855, comprises four separate schools: the College; the Normal School; the Academy, which is a senior high school; and the Foundation-Junior High

**Berengar I.**, king of Italy (d. 924), was crowned king in 887, and emperor of the West in 915.

**Berengar II.**, grandson of Berengar I., was crowned king in 950.

**Berengaria**, (?- c. 1230), queen of Richard I. of England, was the daughter of Sancho VI. of Navarre. While Richard was on his way to the Crusades in 1191, she was married to him in Cyprus.

**Berengarius of Tours** (998-1088), French theologian. About 1040 he became director of the cathedral school of St. Martin's, but developing liberal views concerning transubstantiation, he was imprisoned by Henry I.



School, offering work through the first nine grades. Very few students are accepted who come from outside of the mountain region. There is no tuition charge. Every student gives daily service in payment for his privileges. The institution offers vocational work in agriculture, home economics, industrial arts, weaving, nursing and business.

**Bereg**, county, Czechoslovakia; p. 225,000. The chief town is Beregszasz.

**Berendt, Karl Hermann** (1817-78), German ethnologist. He travelled and resided in Nicaragua and Mexico, engaged in the study of the ethnology and linguistics of the Mayan tribes.

and persecuted by Pope Gregory VII. A selection from his works was published by Vischer in 1834.

**Berenice**, (mod. *Sakayt-el-Kubla*), ancient seaport, Egypt. Interesting inscriptions have been found here.

**Beresford, Lord Charles William de la Poer** (1846-1919), noted British admiral. From 1886 to 1888 he was a lord of the Admiralty. He retired from active service in 1911. He compiled, with Mr. H. W. Wilson, *A Life of Nelson* (1898). He also wrote *The Break-up of China* (1899), *The Betrayal* (1912), and essays on naval affairs.

**Beresford, William Carr, Viscount Ber-**

**esford** (1768-1854), British general. He was made a baron in 1814, and a viscount in 1823.

**Berezina**, river in Russia. It is famous for the disastrous passage of the French Grand Army during its retreat (1812).

**Berg, Duchy of**, a former duchy of Germany. Its capital was Dusseldorf. At the Congress of Vienna in 1815 it was ceded to Prussia.

**Bergaigne, Abel** (1838-88), French Orientalist and philologist. Among his numerous works are *La religion vedique d'après les hymnes du Rig-Veda*, his most important work (1878-83); *Manuel pour étudier la langue sanscrite*; and several translations from the Sanskrit.

**Bergamo**, province, Italy; p. 603,961.

**Bergamo** (anc. *Bergomum*), town, Italy, capital of the province of Bergamo. It consists of a mediaeval old town crowning a hill 480 ft. above the new town. Its churches and the Carrara Academy contain paintings by artists of the Lombard school; p. 106,450.

**Bergamot**, variety of citrus fruit (*Citrus aurantium*, var. *bergamia*) with an aromatic rind from which is extracted oil or essence of bergamot, cultivated chiefly in Italy and France. Certain varieties of pear, whose flavor recalls that of bergamot, are called by this name.

**Bergen**, the Flemish name of Mons in Belgium.

**Bergen**, (formerly *Bjorgvin*), town and seaport, Norway. The climate is mild and humid and the city is the chief tourist center for Western Norway. Historically, Bergen is one of the most ancient and interesting towns in Norway. The first coronations of the Norwegian kings were held at Bergen, and some were buried there; p. 115,000.

**Bergen-op-Zoom**, town, Netherlands. It was formerly a strong fortress but was taken by the French in 1747; p. 28,810.

**Bergerac**, town, France. The celebrated white wine Montbazillac is produced in the neighborhood; p. 22,525.

**Bergerac, Savinien Cyrano de** (1619-55), French author. Always of a turbulent disposition, he fought many duels, mostly in consequence of insulting or satirical references to his unusually large nose.

**Bergh, Henry** (1820-88), American humanitarian. The Society for the Prevention of Cruelty to Animals (see CRUELTY TO ANIMALS) was organized with him as president. He founded the Society for the Prevention of Cruelty to Children.

**Bergh, Johan Edvard** (1828-80), Swedish landscape painter. His *View of Uri* is in the Berlin Academy.

**Bergman, Ingrid** (1916- ), actress, b. in Sweden, where she attended the Royal Dramatic School; she came to the U. S., 1939. On the stage, she has played in *Liliom*, *Anna Christie*, *Joan of Lorraine*, and in the motion pictures in *Intermezzo*, *Casablanca*, *For Whom the Bell Tolls*, and *Gaslight*.

**Bergman, Torbern Olof** (1735-84), Swedish chemist-mathematician, developed theory of determination of chemical processes by the various degrees of affinity between substances, which was corrected by Bertholet.

**Bergmehl**, an infusorial earth. See *Kieselguhr*.

**Bergner, Elisabeth** (1900- ), Austrian actress born in Vienna. She received her stage training at the Vienna Conservatory, 1915-19. She made her debut in Zurich, Switzerland in 1919 and in 1921 her talents were recognized when she played Ophelia in *Hamlet*. Thereafter she appeared in leading Shakespearean roles, as *The Taming of the Shrew*, *Richard II*, *As You Like It*. As Joan in the Shavian play of *Saint Joan* she won worldwide fame. Success after success followed, the most important being Ibsen's *A Doll's House* and O'Neill's *Strange Interlude*. With her own repertory group she toured Holland, Denmark, Sweden, Germany, and Austria in 1928-29, presenting her more successful roles. In 1933 she attempted the English stage and in the play *Escape Me Never* duplicated her continental triumphs. Later the same year she appeared in America in the same play. Among her motion pictures are *Catherine the Great*, *Escape Me Never*, and *As You Like It*.

**Bergson, Henri Louis** (1859-1941), French philosopher. In 1901 he was elected a member of the Academy of Moral and Political Sciences, and in 1914 of the French Academy. Bergson's philosophical ideas have had considerable influence. His writings include *Time and Free Will* (1910); *Matter and Memory* (1911); *Laughter* (1911); *Creative Evolution* (1911); *Dreams* (1914); *Life and Matter at War* (1915); *Mind Energy* (1920); *Two Sources of Morality and Religion* (1935); *Creative Mind* (autobiography) (1946). Consult Marble, A. R., *Nobel Prize Winners in Literature, 1901-1931* (rev. ed. 1932); Durant, W. J., *The Story of Philosophy* (rev. ed. 1933); Tomlin, E. W. F., *Great Philosophers: the Western World* (1952).

**Bergström, Hjalmer** (1868-1914), Danish playwright.

**Beriberi**, a disease due to the use of a diet lacking in the accessory food factors, or vitamins. It is commonly a subacute or chronic malady, but may be sudden in onset and rapidly fatal from acute heart failure.

Beriberi is endemic in extensive parts of Eastern Asia, in the tropical and subtropical zones, including China, Indo-China, Japan, the Straits Settlements, and the Dutch East Indies, and is prevalent in the Philippines. Its occasional epidemic occurrence depends upon certain restrictions in the diet of large bodies of men, as in institutions, on sailing vessels, or under military service conditions.

**Bering, or Behring, Vitus** (1680-1741), explorer. Reaching Kamchatka, he determined (1728) that Asia was not, as supposed, joined to America. Later, in 1741, he made the north coast of America (Alaska) but died on Bering Island. An account of the voyage was written by the survivor, Steller. Consult also Laridsen's *Life*.

**Bering Sea (Behring)**, named from Vitus Bering, the most northerly division of the Pacific Ocean, from which it is demarcated by the Aleutian Islands. It receives the Yukon River from Alaska, and the Anadyr from Siberia. From November to May, it is generally impassable, owing to fog and ice. A cold current flows from the Arctic Ocean through Bering Strait; a warm current runs through it from the Pacific. Consult De Windt's *Through the Gold Fields of Alaska to Bering Strait*.

**Bering Sea Controversy**, a dispute between the United States and Great Britain, arising out of the practice of pelagic sealing in the Bering Sea. In order to check the rapid diminution of the herd, the United States claimed (1) that the Bering Sea is a closed sea, over which the United States has exclusive jurisdiction; and (2) that seals are domestic animals, and therefore American property wherever captured. The contentions of the American Government were overruled by the High Court of Arbitration, provided for by the Blaine-Pauncefote treaty of 1892. The arbitrators further decided that a zone of sixty m. around the Pribylov Islands, the property of the United States, should be established, within which the pursuit, capture, or killing of seals by the citizens of either of the governments should be prohibited. Several later commissions considered the question anew. See **SEALS AND SEAL FISHERIES**. Consult Stanton's *Bering Sea Controversy*; Na-

*tional Geographic Magazine* (December, 1911).

**Bering Strait**. See **Bering Sea**.

**Berkeley**, city, California, Alameda co., on San Francisco Bay; the seat of the Letters and Science Colleges of the University of California; p. 113,805.

**Berkeley**, parish and market town, Gloucestershire, England. The Vale of Berkeley is famous for Gloucester cheese; p. 790.

**Berkeley, George** (1685-1753), Irish metaphysician and philanthropist. In his *Essay toward a New Theory of Vision* (1709) he argued that the immediate objects of sight are all mind-dependent appearances. This essay was followed by the *Principles of Human Knowledge* (1710), in which he boldly represents as 'self-evident truth' that all those bodies which compose the mighty fabric of the world could have no real subsistence after the extinction of all percipient mind. By an unmetaphysical generation this was supposed to imply that the material world is only an idle dream. To correct this misunderstanding, Berkeley published *Three Dialogues between Hylas and Philonous* (1713). In 1713 he is found in London, introduced by his countrymen Swift and Steele to the brilliant society in which Addison and Pope were prominent. The prevailing tone of morals shocked him. He proposed a remedy in a fervid *Essay toward Preventing the Ruin of Great Britain* (1721).

Despairing of the Old World, he was determined to spend the rest of his life in Bermuda, at the head of an institution which might become a fountain of Christian civilization for the American Indians. His social charm and enthusiasm attracted Sir Robert Walpole, and a promise of \$100,000 for Bermuda was voted by the House of Commons. In 1728 we find him on his way to Bermuda, at Rhode Island, where he waited for three years for the promised endowment. He was in the end disappointed by Walpole, and in 1731 returned to London.

In 1734 he became bishop of Cloyne by the favor of Queen Caroline. His American experience reminded him of the marvellous medicinal properties of tar, and an eccentric ingenuity connected the medicine with metaphysics; tar, as a possible panacea, suggested the final interpretation of the universe. This train of thought found expression in *Siris* (1744), the most curious book in English metaphysics, and Berkeley's last word on philosophy. Those works which had been published in his lifetime appeared in 1898, with a biographical introduction by the Right Hon. A. J. Balfour. Consult Fraser's *Berkeley* (Black-



wood's 'Philosophical Classics'); *Works* (edited by Fraser); Mill's *Three Essays on Religion*; Schwab's *Der Utilitarismus Berkeleys*; *The Querist* (new ed. by Johns Hopkins Press, 1910); Mead's *Bibliography of George Berkeley, Bishop of Cloyne* (1910).

**Berkeley, Sir George Cranfield** (1753-1818), British admiral. He was also lord high admiral of Portugal.

**Berkeley, James**, Third Earl of (1680-1736), British admiral, known in earlier life as Lord Dursley.

**Berkeley, Miles Joseph** (1803-89), English botanist. He wrote *Outlines of British Fungology* (1860).

**Berkeley, Sir William** (c. 1609-77), English colonial administrator. He was governor of the colony of Virginia (1642-52 and 1660-77).

**Berkhamstead, or Great Berkhamstead**, parish and market town, Hertfordshire, England.

**Berkshire**, county of England, s. of the River Thames and w. of Surrey. Within its borders are Windsor Castle, whence it is known as the 'royal county.' Interesting historically is the Great 'White Horse,' nearly 400 ft. in length, cut on a chalk hillside, said to commemorate the battle of Ashdown (861) but probably pre-Roman; p. 402,939.

**Berkshire Hills**, the hill region of Berkshire co., Massachusetts, a continuation of the Green Mountains of Vermont. It contains several towns noted as summer resorts.

**Berle, A. A. Jr.**, (1895- ), one of several advisors to President Roosevelt known collectively as the 'brain trust.' Subsequently City Chamberlain of New York City. Entered Harvard University at the age of 13, was graduated at 17 and received a degree of Bachelor of Laws from Harvard Law School at 21. Practices law in New York City. Was Assistant Secretary of State, 1938-45. Served as Ambassador to Brazil (1945-46).

**Berlichingen, Goetz or Gottfried von**, 'of the Iron Hand' (1480-1562). He was a typical example of the baronial robbers of the Rhine—the subject of Goethe's tragedy, *Goetz von Berlichingen*, translated by Scott in 1799.

**Berlin**, city, capital of Germany. The Spree, which runs through the center of the city, is crossed by a large number of bridges, of which the Palace and Emperor William are perhaps best known. On an island in the center of the city stands the former royal palace. From the island stretches westward the most famous street in Berlin, 'Unter den Linden'—from the Palace to the Brandenburg Gate.

The Tiergarten Quarter, to the s. of the park, bordering the Landwehr Canal, is a fashionable residential section.

In Wilhelm Strasse are the Prussian Parliament Houses (1893-8). The churches of Berlin are generally of brick, the oldest being St. Mary's and St. Nicholas'.

Higher education is provided by the University of Berlin (see BERLIN, UNIVERSITY OF), the Academy of Architecture, and schools of music, Oriental languages, arts, mining, engineering, artillery, agriculture, and other similar institutions. There are numerous academic, technical, and commercial high schools,



Berlin and Environs.

secondary and primary schools, and kindergartens. The German Institute for Foreigners offers assistance to those wishing to study the German language and customs.

Berlin is important as an industrial and trade center.

Prior to World War I Berlin was governed by the Police Department, under the direction of the Prussian Minister of the Interior, and by a Common Council. Following the war the central government was entrusted to a magistracy of about thirty members and a central council not to exceed 225 in number. A radical change took place, also, in the franchise. The old division of the voters into classes was done away with, and the universal franchise was established. The city revenues are derived from public utilities conducted by the municipality.

Berlin was originally a Wendish fishing village named Kolln. In 1448 it was chosen as their place of residence by the Hohenzollern rulers of Brandenburg. During the Thirty Years' War it was besieged and destroyed by the Swedes and Imperialists, to be rebuilt by Frederick William (1640-88), who began the work of making it one of the finest cities of Europe.

The city was heavily bombed during World War II by the allied air forces; it is now in the process of rebuilding the damaged areas. Population is about 3,200,000.

popular songs are *Alexander's Ragtime Band*; *All Alone* and *God Bless America*.

For the last few years he has been actively associated with the musical end of motion picture production. In 1936 and 1937 he wrote the music for the movie musicals, *Top Hat*, *Follow the Fleet* and *On the Avenue*. He wrote both words and music for *Yip-Yip Yaphank* and *This Is the Army* (1942). He married Ellin Mackay.

**Berlin, Congress of** (June, 1878), a meeting of representatives of the European powers invited by Prince Bismarck to revise the



Elmendorf Photos, Copyright Ewing Galloway, N. Y.

Berlin, The Meeting Hall of the Reichstag (Reichstagsgebäude).

Consult *Berlin und seine Bauten*, issued by the Architects' Association; Ring's *Die Deutsche Kaiserstadt* (2 vols.); historical works by Fidicin, Streckfuss, and Schwebel; Geiger's *Berlin, 1688-1840*, a history of the city's intellectual development; Osborn's *Berlin* (1909). Griebcn's *Berlin and Environs* (1912); Baedcker's *Berlin and Its Environs* (1912); Marc Henry's *Trois Villes; Vienne-Munich-Berlin* (1917); Kaeber's *Berlin in Weltkriege* (1921); Laforgue's *Berlin, la cour et la ville* (1922).

**Berlin**, middle name of Kitchener, Ontario. See **Kitchener**.

**Berlin, Irving** (1888- ), born in Russia and brought to the United States in 1893. He is a composer of popular songs, many of which are included in musical revues such as the Ziegfeld Follies. A few of his most

Russo-Turkish treaty of San Stefano (1878). The Congress recognized the independence of Roumania, Servia, and Montenegro. Bulgaria was reduced in size and became a self-governing Turkish tributary state. Greece was promised a modification of her frontier, which was carried out in 1881. Roumania returned to Russia the Bessarabian territory taken from her by the Treaty of Paris, receiving in return the Dobrudja. Ardahan, Kars, and Batum were ceded by the Porte to Russia. Great Britain, by establishing herself in Cyprus, assumed virtual control of the eastern part of the Mediterranean. See **EUROPE. History**.

**Berlin Decree**, a decree issued by Napoleon at Berlin on Nov. 21, 1806. The decree declared the British Islands under blockade. See **CONTINENTAL SYSTEM**; **EMBARGO**.

**Berliner, Emile** (1851-1929), German-American inventor. He came to the United States in 1870. He has patented many valuable inventions connected with the telephone. In 1887 he invented a phonograph (q.v.). He was the first to make and use an internal combustion motor which was later used on aeroplanes. After 1901 he became active in the campaign against impure milk.

**Berlin, University of (Friedrich Wilhelm University)**, dates its foundation from 1809. The university includes schools of Theology, Jurisprudence, Medicine, and Philosophy. The University has numerous institutes, clinics, seminars and other similar organizations. Consult Lenz' *Geschichte der Friedrich-Wilhelms Universität* (4 vols., 1910).

**Berlioz, Hector** (1803-69), French musical composer. In 1841 he made the first of a series of European tours which established his reputation as a composer and conductor of the first rank. Among his best known works are his symphonies, and a celebrated *Te Deum*. Berlioz is comparable to Wagner in his supreme command of orchestration. Consult his *Memoirs*, tr. by Rachel and Eleanor Holmes (1932); Biancolli, L. L., and Peyser, H. F., eds., *Masters of the Orchestra* (1954).

**Bernejo, Rio**, river, South America. Total length, over 1,100 m.

**Bermondsey**, a borough of London. See London.

**Bermuda Grass**, or **Bahama Grass**. See Cynodon.

**Bermuda Hundred**, a tract of land in Chesterfield co., Virginia, said to be the land granted in response to a petition (1639) from Bermuda, then over-populated. It played a prominent part in the Civil War: the Army of the Potomac under Grant, were shut up in Bermuda Hundred for part of a month; p. of the district 3,875.

**Bermudas** (discovered by the Spaniard Bermudez in 1515), or **Somers Islands**, so-called from Sir George Somers, who was wrecked here in 1609, a group of about 350 small coral islands belonging to Great Britain, in the Atlantic Ocean. Most of the land area is contained in the five islands of Hamilton or Bermuda, St. George, St. David, Somerset, and Ireland. The climate is temperate and healthful, and the islands are a popular winter resort for Americans. Numerous picturesque and beautiful caves are an interesting sight. The inhabitants, about two-thirds of whom are colored, are chiefly occupied in growing potatoes, onions, arrowroot, and lily bulbs. The chief town is Hamilton, the capital. The

colony is administered by a governor appointed by the Crown. Consult Strode, Hudson, *The Story of Bermuda* (1946); Zuill, W. E. S., *Bermuda Journey* (1946).

**Bern, Switzerland**. See **Berne**.

**Bernadotte, Folke, Count** (1895-1948), Swedish diplomat, nephew of King Gustavus V of Sweden, was born in Stockholm and educated at the Universities of Copenhagen and Uppsala. He was president, Swedish Boy Scouts (1943) and of Swedish Red Cross (1946-48); UN mediator for Palestine (1948) and assassinated by extremists in Jerusalem.

**Bernadotte, Jean Baptiste Jules** (1763-1844), French general who, in 1810, became king of Sweden.

**Bernard, Claude** (1813-78), French physiologist. His earliest researches were devoted to the physiological action of the various secretions of the alimentary canal. His proof that the sole use of the pancreatic juice in the digestive system is so to modify the ingested fats is a masterpiece of biological demonstration. Still more important was his demonstration of the connection between this function of the liver and the nervous system.

**Bernard, Sir Francis** (c. 1711-79), English colonial administrator in America, was born in Nettleham, England. He was governor of New Jersey 1758-60, and of Massachusetts (1760-9).

**Bernard (Great Saint) Pass**, the easiest pass over the Pennine Alps (8,111 ft.). A hospice was established there as early as the 9th century, and was refounded in the 11th century by St. Bernard of Menthon. Since the 12th century the hospice has extended hospitality to travellers, and with the help of the dogs that are called by St. Bernard's name, succor those who have succumbed to cold and fatigue.

**Bernardin de Saint-Pierre**. See **Saint-Pierre**.

**Bernard (Little Saint) Pass** (7,179 ft.), leads from the French valley of the Upper Isere to the Italian valley of Aosta.

**Bernard of Morlaix**, also known as **Bernard of Cluny**, French Benedictine monk of the 12th century, author of a dactylic poem, *De Contemptu Mundi*.

**Bernard, St., of Clairvaux** (1091-1153), a notable theologian of the Middle Ages, came of a noble Burgundian family. After two years spent in the Cistercian monastery of Citeaux, in 1115 he became first abbot of the monastery of Clairvaux, in Champagne. Bernard's saintly life gave him an unexampled influence and he

founded no fewer than seventy monasteries. In 1128 he drew up, by request, the statutes of the Knights Templar. He was largely instrumental in securing the condemnation of Abelard at the Council of Sens (1140). He moved the enthusiasm of France for the second crusade; and was so disheartened by its failure that his last years were clouded by sorrow. Bernard was canonized in 1173.

The reformed Cistercians, an order instituted by him, are often called Bernardines. His writings, which comprise letters, sermons, and hymns, hold high rank in the literature of mysticism. Many of his noble hymns ('Jesus, the Very Thought of Thee,') have been translated. Mabillon printed his works at Paris in 1690.

**Bernardsville**, borough, New Jersey; p. 3,956.

**Bernauer, Agnes**, a beautiful German girl, secretly married to Albert of Bavaria, condemned as a witch, and drowned in the Danube on Oct. 12, 1435. This story furnished a theme for German writers.

**Bernays, Augustus Charles** (1854-1907), American surgeon. He was a pioneer in anti-septic surgery. His works include *Chips from a Surgeon's Workshop*.

**Bernburg**, town, Germany. In the vicinity are the saline springs of Leopoldshall; p. 53,367.

**Berne** (Bern), the most populous of the Swiss cantons, and the second in size. Of the 485 unproductive sq. m., 111 are occupied by glaciers. The population is German-speaking and Protestant, except in the Bernese Jura, where it is French and Roman Catholic. Sixty per cent. of the entire Swiss clock output comes from this canton. Fruit and cattle are exported; p. 792,264.

**Berne**, city, Switzerland, capital of Berne canton, and (since 1848) of the Swiss Confederation. It commands a superb view of the snowy Bernese Oberland Alps. It ranks as the 4th town in Switzerland, coming after Zurich, Basel, and Geneva. The name seems really to be derived from 'bear,' and live bears have for centuries been kept in a pit outside the town. The main street has quaint watch towers, fountains, and arcades; p. 146,499.

**Berne**, commune in the republic of Oldenburg, Germany; formerly the capital of the Stedinger Land; p. 4,000.

**Berne Convention**. See Copyright.

**Berners**, or **Barnes**, **Darne Juliana** (flourished in the first half of the 15th century), by tradition, daughter of Sir James Berners of Berners Roding, Essex, and prioress of Sopwell

nunnery, near St. Albans. Author of treatises on *Huntynge* and *Fysshynge*.

**Bernese Oberland Alps**, a chain of the Alps rising to the n. of the main chain, from which they are separated by the upper portion of the Rhone valley. The most popular tourist resorts are Thun and Interlaken. The principal tourist resort is Interlaken. The chief summit is the Jungfrau (13,669 ft.). See ALPS.

**Bernhard, Duke of Saxe-Weimar** (1604-39), a Protestant general in the Thirty Years' War.

**Bernhardt, Sarah** (christened **Rosine Bernard**), (1845-1923), French actress, was born in Paris, on Oct. 23, 1845. Her parents were Dutch, her mother being of the Jewish religion and her father Catholic. Entering the Paris Conservatoire in 1860, she made her *debut* at the Theatre Francais in 1862 in *Iphigenie*. But her impetuous disposition led to trouble with a senior member of the company, and she was forced to leave the Francais. In 1867 she secured an engagement at the Odeon, and as the Queen in *Ruy Blas* she gained great success, and was warmly praised by Victor Hugo. Returning to the Francais, she was recognized as the successor of Rachel. Two other great successes of this period were *Dona Sol* in Victor Hugo's *Hernani*, and in *La dame aux camelias* by Dumas the Younger.

In 1881 Bernhardt visited the United States, and the next nine years were a triumphal progress around the world. In 1882 she married M. Damala, a member of her company, but soon left him. Her *Hamlet* (1899) was received with unanimous applause—the Danish prince was for the first time made intelligible to a French audience; and her impersonation of the title *role* in Rostand's *L'Aiglon* (1900) was a marvel of dramatic power. In 1900 she brought *L'Aiglon* to America, and in 1905, 1910, 1913 and 1916 was again in the United States.

Mme. Bernhardt long retained her extraordinary vitality, her unique grace, and her wonderful voice. Consult her own *Memories of My Life* (1907); Verneuil, Louis, *The Fabulous Life of Sarah Bernhardt* (1942).

**Berni, Francesco** (1497-1536), Italian poet. He gained the favor of the Medicis. His poems are unsurpassed for their wit, lightness, and elegance of form, notably his *Rime Burlesche* (1538). *Orlando Innamorato* (1541) ranks next to Ariosto's *Orlando Furioso*.

**Bernicia**, an Anglican kingdom founded by Ida (547-559) during the period when the

Angles conquered the northeast of England. See NORTHUMBRIA.

**Bernina Alps.** See **Rhätian Alps.**

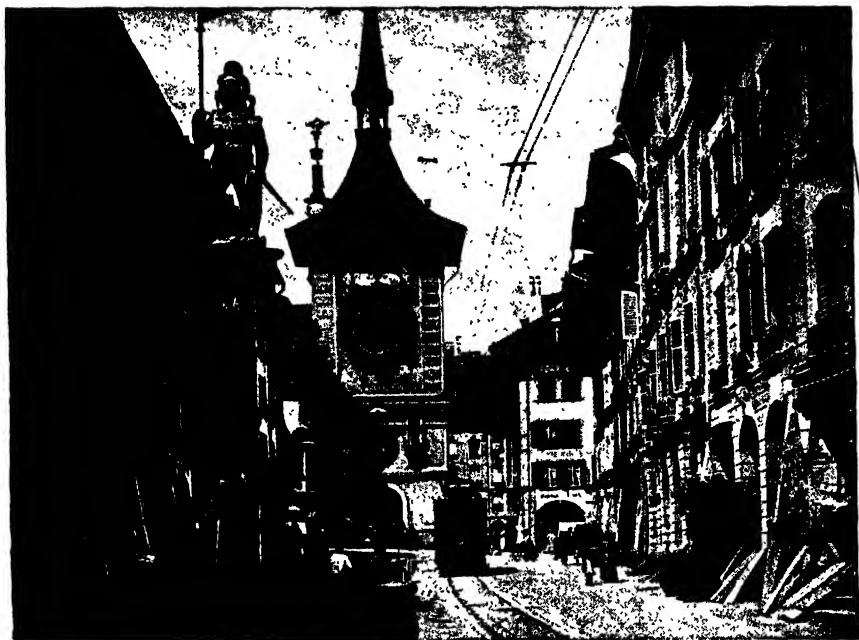
**Bernina Pass** (7,645 ft.), a mountain pass leading from the Upper Engadine (Switzerland), to the Italian Valtellina.

**Bernini, Giovanni Lorenzo** (1598-1680), Italian architect and sculptor in the baroque style. He enjoyed the patronage of Urban VIII. for whom he designed the great colonnade of St. Peter's. Among other well known works are *David*, *Apollo and Daphne*, *The Rape of Proserpine*, and *Sante Bibbiano*.

rival of Newton and Leibniz, and sided with Descartes, as James did with Newton.

**DANIEL** (1700-82), was born in Groningen, 'son of John Bernoulli' (his signature and pride). He published his treatise, *Hydrodynamica* (1738), the first on the subject, in which he advocated the Bernoulli system of propulsion for ships; filled the chair of natural and of speculative philosophy at Basel.

Of note also were **NICHOLAS** (1687-1759); professor of mathematics at Padua; **JOHN** (1710-90), wrote on capstan, magnet, light; **JOHN** (1744-1807), astronomer royal of Berlin;



*Berne, Switzerland.*

The West Gate of the Old Town and the Zähringen Fountain in the foreground.

**Bernoulli**, family of mathematicians, refugees from Antwerp and Alva, settled at Frankfurt (1583), and afterward at Basel.

**JAMES** (1654-1705), versifier in Latin, French, and German, self-taught in geometry, was professor of mathematics at the University of Basel (1687). From a hint of Leibniz he developed and made his own the differential calculus; solved the problem of the logarithmic spiral (1690), and in his *Ars Conjectandi* (1713) prepared the way for Lagrange's calculus of variations.

**JOHN** (1667-1748), brother of James, was his brother's successor at Basel. He was a

**JEROME** (1745-1829), naturalist; **JAMES** (1759-89), professor of physics; **CHRISTOPHER** (1782-1863), professor of natural history.

**Bernstein, Eduard** (1850-1932), German political writer and Social Democratic leader. His book, (1899; Eng. trans., under the title *Evolutionary Socialism*, 1909), in which he advocated a more opportunist policy, gave rise to keen discussion.

**Bernstorff, Albrecht, Count von** (1809-73), German diplomat, Prussian ambassador to St. James.

**Bernstorff, Andreas Peter, Count** (1735-97), Danish statesman. As minister of foreign

affairs (1773) he concluded a defensive alliance with Russia.

**Bernstorff, Johann Hartwig Ernst, Count** (1712-72), Danish statesman, son of the Hanoverian baron and minister, Joachim von Bernstorff. Bernstorff succeeded in satisfactorily adjusting the long-outstanding Got-torp difficulty, whereby Denmark surrendered Oldenburg and Delmenhorst in exchange for Schleswig.

**Bernstorff, Count Johann Heinrich von** (1862-1939), German diplomat, was born in London, where his father, Albrecht, was ambassador. In 1887 he married Miss Jeanne Luckmeyer, of New York. From 1902 to 1906 he was councillor and secretary to the German embassy at London. In 1908 he became German ambassador to the United States, a post he retained until the United States' entrance into World War I. He became a member of the Democratic party in the Reichstag after the revolution and was chairman of the German League of Nations Union. In 1932, coincident with the rise of the National Socialist Party, he renounced the Fatherland and retired to seclusion in Geneva, Switzerland.

**Bereans, or Bereans**, a religious sect in Scotland, founded in 1773 by John Barclay, a native of Perthshire.

**Berosus**, (c. 330-250 B.C.), a priest of Belus at Babylon, wrote a history of Babylon in Greek.

**Berre, Etang de**, salt-water lagoon (60 sq. m.), France, connected with the Mediterranean by the Canal de Bouc (3 m. long).

**Berri (Berry), Charles Ferdinand, Duc de** (1778-1820), younger son of Charles x. fled (1789) to Italy at the Revolution; served with Conde against France; abandoned his English wife in 1814, married Marie, Duchess of Naples in 1816, and in 1820 was assassinated at the opera.

**Berruguete, Alonzo** (c. 1480-1561), Spanish sculptor, painter, and architect. He was appointed royal sculptor and painter to Charles v.

**Berry.** See Fruit.

**Berry, Martha McChesney** (1866-1942) American educator and philanthropist. She started on her own farm in Mount Berry, Ga. a school which developed into the Martha Berry Schools, training poor mountain boys and girls.

**Berry, Mary** (1763-1852), English author. In the winter of 1788 she and her sister Agnes fourteen months her junior, met Horace Walpole, then almost seventy years of age, and

close friendship developed. Consult her *Journals and Correspondence*.

**Berryer, Pierre Antoine** (1790-1868), French lawyer and politician. His works were published under the titles *Discours parlementaires* (5 vols. 1872-4) and *Plaidoyers* (4 vols. 1875-8).

**Bersaglieri**, (It. 'marksmen'), a corps of sharpshooters of the Italian army.

**Berseem, or Egyptian Clover** (*Trifolium alexandrinum*), a species of *Trifolium* allied to the ordinary red clover.

**Berserks, or Berserkers**, the name given to Norse warriors who figure in the ancient sagas, and later applied to hard fighters in a renzied state.

**Bert, Paul** (1833-86), French physician. He carried on important research work in skin rafting, respiration, and the action of anaesthetics.

**Bertha, Bercta, or Adilberga**, the name of several famous women, real and legendary. St. Bertha (d. before 616), daughter of Charibert, king of the Franks, married Æthelbert, king of Kent (c. 560). She was influential in spreading Christianity among the Anglo-Saxons.

Bertha, wife of Rudolf II. (937), king of Upper Burgundy, acted as regent for her infant son Conrad.

Bertha, *alias* Agatha, was the betrothed of Hereward.

Bertha (d. 783), married Pepin the Short, and was mother of Charlemagne.

**Berthelot, Pierre Eugène Marcellin** (1827-1907), French chemist and statesman. His studies in the synthesis of organic substances were of great importance. His publications include: *Traité d'elementaire de chimie organique*; *Les carbures d'hydrogene* (1901).

**Berthier, Louis Alexandre** (1753-1815), French marshal. He began his military career as an officer of Louis xv., and fought under Lafayette in the American Revolution (1778-82). His *Memoires* were published in 1827.

**Berthold von Regensburg**, (c. 1220-72), a Franciscan friar, one of the most popular preachers of the Middle Ages in Germany. His *Sermons* (2 vols.) have been edited by Pfeiffer and Strobl.

**Berthollet, Claude Louis, Count** (1748-1822) French chemist. He was elected to the Academy of Sciences in 1781. Berthollet was an ardent reformer of chemical nomenclature.

**Bertholletia.** See Brazil Nut.

**Bertillon, Alphonse** (1853-1914) French penologist. In 1880 he perfected the famous system of criminal identification introduced

into the Paris police system. He was also a handwriting expert in the Dreyfus case.

**Bertillon System**, an anthropometric method devised by M. Alphonse Bertillon for the identification of criminals based upon the fact that no two persons ever give exactly identical physical measurements. The system has been introduced into the United States and has been adopted in the larger penal institutions. Consult Bertillon's *Identification of Criminals* (trans. by Gallus Muller).

**Bertin, Louis François** (1766-1841) French journalist called L'AINE to distinguish him from a brother of the same name. During the revolution he edited *L'Eclair* and in 1800 began to conduct the powerful *Journal des débats* (founded 1789).

**Bertrand, Henri Gratien, Count** (1773-1844) French general. He served under Napoleon, distinguishing himself at Austerlitz, Grossbeeren, Leipzig and Waterloo and shared in Napoleon's banishment to St. Helena. His *Campagnes d'Égypte et de Syrie, Mémoires pour servir à l'histoire de Napoleon, dictés par lui-même à Sainte Hélène* was published by his sons in 1847.

**Bertran de Born** (c. 1140-1215), Provençal troubadour. Consult Hueffer's *The Troubadours*.

**Bervic, Charles Clément** (1756-1822), French engraver.

**Berwick, James Fitz-James, Duke of** (1670-1734), French marshal, the natural son of James II. and Arabella Churchill, sister of the Duke of Marlborough. In 1706 he was created a marshal of France and sent into Spain, where he firmly seated Philip V. on the throne. His *Mémoires*, written by himself, were completed by Abbe Hosk and published in 1778.

**Berwick-on-Tweed**, seaport and market town, England. It was involved in much of the Border warfare, the siege by the English in 1296 being especially memorable. It was later by an Act of Parliament included in England; p. 12,994.

**Berwickshire**, a border county in the south-eastern part of Scotland. The chief mountain range is the Lammermuir; the highest peak, Seenes Law (1,683 ft.). The principal river is the Tweed.

**Beryl**, a silicate of aluminum and beryllium. The bright green and pale blue or green transparent varieties are emerald and aquamarine.

**Beryllium**, (Be), also known as Glucinum (Gl; 9.1.), a rare metallic element occurring in beryl and other silicates.

**Berzelius, Jöns Jakob, Baron** (1779-1848),

celebrated Swedish chemist. His chief work was the determination of the combining proportions and atomic weights of the elements by an improved analytical method. He wrote *Text-book of Chemistry* translated into various languages.

**Bes**, an Egyptian god of art, of song and dance, represented as clad in a panther hide.

**Besançon**, town, first-class fortress, and episcopal see, France; p. 63,508.

**Besant, Mrs. Annie, nee Wood** (1847-1933), English theosophist, was married in 1867 to the Rev. Frank Besant, vicar of Sibsey, Lincolnshire, from whom she legally separated in 1873. In 1889 she became a disciple of the theosophist, Madame Blavatsky, and in 1907 she was elected president of the Theosophical Society. In 1898 Mrs. Besant founded the Central Hindu College at Benares. *Through Storm to Peace* appeared in 1893. Mrs. Besant sponsored the young Hindu Jeddú Krishnamurti as a 'second Messiah,' bringing him to the United States in 1930. In the following year she was injured in a fall and never recovered her health. She died in 1933, aged 86, at Adyar, near Madras, India.

**Besant, Sir Walter** (1836-1901), English novelist and critic. He began to publish novels written in conjunction with his friend James Rice—*Ready-money Mortiboy* (1871), *The Seamy Side* (1881). Rice died in 1882, but Besant continued writing. His novel *All Sorts and Conditions of Men*, considered 'utopian' in theory, led to the erection of the People's Palace (1887) in the East End of London.

**Besika Bay**, on the n.w. coast of Asia Minor.

**Beskid**, or **Bieskid Mountains**, a range of the Carpathians.

**Beskow, Bernhard von, Baron** (1796-1868), Swedish author, a determined opponent of the Swedish new romanticists. His best works are the dissertations and biographies (1860-6, 1870) published by the Academy.

**Besnard, (Paul) Albert** (1849-1934), French artist.

**Bessarabia**, a region of the Moldavian S.S.R., formerly a province of Rumania, between the Dniester and the Black Sea. It was ceded to Russia in 1940.

**Bessarion, Johannes** (1403-72), Greek cardinal. He was one of the small band who revived the study of Greek in Italy, and so initiated the humanistic movement in Europe. His works are collected in Migne's *Patrologia Græca*.

**Bessel, Friedrich Wilhelm** (1784-1846), Prussian astronomer. His most notable

achievements were the discovery of the parallax of the fixed star 61 Cygni, and his great *Fundamenta Astronomiæ*.

**Bessels, Emil** (1847-88), German Arctic explorer. In 1871 he was entrusted by the U. S. Government with the leadership of the scientific staff of the polar expedition under Charles Francis Hall. The expedition (1871-3), in the *Polaris*, reached lat. 82° 26'; but unfortunately the ship was wrecked, and all the collections were lost. Bessels wrote *Report on the Scientific Results of the 'Polaris' Expedition* (1876).

**Bessemer, Sir Henry** (1813-98), English metallurgist and inventor. He is known chiefly for his process for the manufacture of steel, put forward in 1856, which revolutionized that industry throughout the world. Bessemer was knighted in 1879.

**Bessemer Process.** See **Steel**.

**Bessières, Jean Baptiste** (1768-1813), Duke of Istria (1809) and marshal of France (1804). At Marengo, his cavalry charge decided the day.

**Best, William Thomas** (1826-97), English organist. Best did much to familiarize the public with the organ works of Bach.

**Bestiary**, (Fr. *bestiaire*), a popular series of mediaeval books, consisting of descriptions of animals which are afterward treated as allegorical types of the spiritual life. See Wright's *Reliquiæ Antiquæ* (1841-3).

**Bestuzhev, Alexander Alexandrovitch** (1797-1837), Russian writer. He first achieved prominence as editor, with Kilyev, in 1822, of the *Polar Star*, the first Russian literary annual, modeled after the German *Almanache*.

**Besuki**, (Dutch *Besoeki*), residency of Java, Dutch East Indies, the easternmost in the island, with an area of 3,922 sq. m.

**Beta.** See **Beet**.

**Betanzos**, city, Spain, in the province of Corunna. It has interesting churches of the 13th and 14th centuries and a ruined Moorish castle; p. 10,504.

**Beta Rays.** See **Radium**.

**Betelgeux**, ( $\alpha$  Orionis), a red star of the first magnitude, but slightly variable. It forms a huge equilateral triangle with Procyon and Sirius.

**Betel Leaf**, or **Betel Pepper**, the foliage of several species of climbing peppers (*Piper*).

**Betel Nut Palm**, or **Pinang** (*Areca catechu*), a graceful spineless palm, a native of the Malay Peninsula. The fibrous fruit, about the size of a hen's egg, is bright orange or red in color and contains a hard seed or nut as large as a filbert. The natives cut the nuts into

slices, add lime to them, roll them in a betel pepper leaf, and chew them. This habit, which is common to all Indian and Malayan races, colors the mouth and lips red and blackens and eventually destroys the teeth.

**Betham-Edwards, Mathilda Barbara** (1836-1919), English novelist and poet. Her published works include *In French Africa* (1913); *Hearts of Alsace* (1916). Consult her *Reminiscences* (1898) and *Anglo-French Reminiscences* (1899).

**Bethany**, an ancient village on the south-eastern spur of the Mount of Olives, Palestine. Bethany is frequently mentioned in the New Testament, and was a favorite resort of Jesus. It was the home of Martha and Mary and their brother Lazarus, whose reputed tomb is still shown to visitors. Christ's ascension took place 'over against Bethany.'

**Bethany College**, a Lutheran institution for both sexes at Lindsborg, Kansas, founded in 1881.

**Bethel** ('house of God'), a town in Palestine about 12 m. n. of Jerusalem. Abraham pitched his tent and built his altar near Bethel and it was the scene of Jacob's vision.

**Bethell, Richard**, first Lord Westbury (1800-1873), English jurist, was born in Bradford-on-Avon. Among his most important acts were his efforts to improve the methods of legal training, his advocacy of the codification of the law, and his zealous attempts at law reform.

**Bethesda**, ('house of the stream'), a pool with five porches, in Jerusalem, where Christ healed the infirm man.

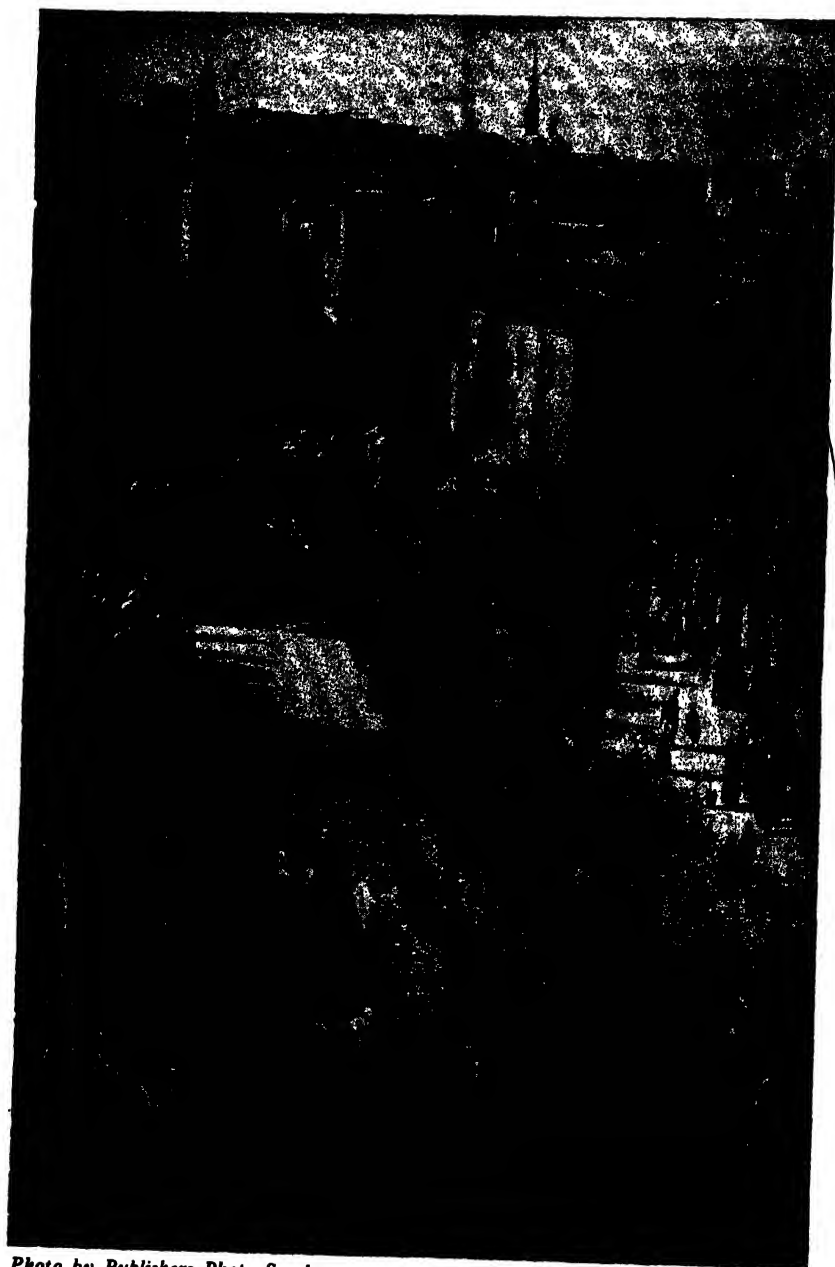
**Beth-horon**, **Lower** and **Upper**, two villages, Palestine. The modern name is Beit-Ur.

**Bethlehem**, village in Israel; 5 m. s. of Jerusalem. Its modern name is Beit Lahm and it is a thriving town whose inhabitants live chiefly by agriculture and breeding cattle. The most important building is the Church of the Nativity, erected over the traditional birthplace of Christ, in the eastern part of the town; p. about 6,800, mostly Christians. Bethlehem is famous as the home of David and the birthplace of Jesus Christ.

**Bethlehem**, city, Pennsylvania, Northampton co. Bethlehem is especially celebrated for its annual Bach festival. It is the seat of Lehigh University and of Moravian Colleges for men and women. The Bethlehem Steel Corporation and Shipbuilding Corporation have their main offices here, and the city is a distributing center of importance; p. 66,340.

**Bethlehemites**, a name assumed by several orders in the Catholic Church. The name





*Photo by Publishers Photo Service.*

*Bethlehem.*

The Catholic Archbishop arriving at the Church of the Nativity on Christmas Eve.

Bethlehemites has also been given to the disciples of John Huss, who preached in the Bethlehem Church at Prague.

**Bethlen, Garbor**—i.e. **Gabriel**—(1580-1629), Transylvanian prince, of a celebrated Hungarian family, was elected to the throne in 1613.

**Bethmann-Hollweg, Theobald von** (1856-1921), German statesman, was born in Hohen-Finow, Brandenburg and educated at Bonn, where he met, and became the friend of, Emperor William II. Bethmann-Hollweg upheld Germany's invasion of Belgium in 1914 and the phrase 'a scrap of paper' in reference to international treaties is attributed to him.

**Bethnal Green**, a metropolitan and parliamentary borough of Greater London. See LONDON.

**Beth-peor**, a place east of the Jordan whose exact site is at present a matter of controversy.

**Bethphage**, village of Israel, on Mount Olivet. It was to this village that Christ sent the disciples for the ass upon which he made his triumphal entry into Jerusalem.

**Bethsaida**, town in Israel, on the E. bank of the Jordan, near its entrance into the Sea of Galilee. Here the miracle of the feeding of the five thousand took place and just outside the city Jesus healed the blind man of his infirmity.

**Beth-shemesh** ('house of the sun'), the name given to several places mentioned in the Old Testament. The most important of these towns was in Judah, between Kirjath-jearim and Timnah.

**Bethune**, town, department of Pas-de-Calais, France. Numerous rich coal mines occur in the vicinity. During World War I Bethune was an important point in British communications.

**Bethune, George Washington** (1805-62), American clergyman and poet, was born in New York. He published an edition of Walton's *Complete Angler*.

**Bethune, Thomas**. See **Blind Tom**.

**Betony** (*Stachys betonica*), a hardy herbaceous perennial belonging to the order *Labiata*. It is often known as 'Wood Betony.'

**Betoyan**, a linguistic stock of South American Indians found in eastern Colombia.

**Betrothal**, an engagement or agreement by a man and woman for a future marriage between them. The betrothal *per verba de presenti* still exists in the United States, where not restricted by statute, under the name of the Common Law marriage. Cohabitation no longer has the effect of consummating a betrothal *per verba de futuro*. See **MARRIAGE**.

**Betsiboka**, river, Madagascar.

**Betsileo**, a Malayan people living in the mountainous region of South Central Madagascar. Their chief town is Fianarantsoa.

**Bettelheim, Anton** (1851-1930), Austrian man of letters, was born in Vienna. He edited an excellent biographical series called *Führende Geister*, afterward *Geisteshelden* and *Biographisches Jahrbuch*.

**Betterton, Thomas** (1635-1710), English actor, dramatist, and theatrical manager, was born in Westminster. Betterton was an admirable actor, of fine personal character. Consult Howe's *Thomas Betterton*; Baker's *History of the London Stage and Its Famous Players*.

**Bettinelli, Saverio** (1718-1808), Italian writer, was born in Mantua. He is best known in Italian literature as the writer of an elaborate treatise on *Il risorgimento d'Italia, negli studii, nelle arte e nei costumi dopo il mill:* (1775). Consult Napione's *Vita dell'Abbate S. Bettinelli*, and Tiplado's *Biografia degli Italiani illustre*.

**Betting** may be defined as a system of making contracts, under which payment by one party to another is dependent on an uncertain event, usually the result of a game or race. At common law no form of wagering is criminal, but there has been a difference of judicial opinion whether contracts of this description are *per se* valid and enforceable in a court of justice.

Until comparatively recently the staking of money on horse races was the chief form of public betting in the United States. The older method is known as bookmaking: At the race tracks a part of the enclosure is set aside for bookmakers, who offer odds against every horse in a race. If one horse is a popular favorite, the bookmaker will give odds which either discourage betting on it or reduce the amount he risks to a minimum, inducing the public to bet on other horses by offering longer odds against them until he has succeeded in rounding out his book.

Under the now more widespread mutual system all money wagered on a race is held by one agency, frequently the state, and odds are determined, after the race, by dividing the total stake, less the operator's percentage, proportionately among the successful bettors. At most U. S. tracks mutual tickets are purchased at windows. Elsewhere the backer places his stake in the receptacle set aside for the horse he favors and at the end of the race the supporters of the successful horse divide up all the money staked

on the different horses, less 10 per cent., which goes to the owner of the machine. See also **GAMBLING**; **HORSE RACING**; **LOTTERY**.

**Betto, Bernardo di.** See **Pinturicchio**.

**Betts, Samuel Rossiter** (1787-1868), American jurist, was born in Richmond, Mass. He was an authority on maritime law, and published a standard work on *Admiralty Practices* (1838).

**Bettws-y-Coed**, urban district, Carnarvonshire, Wales. It is beautifully situated among pine-clad hills, and is much visited by tourists.

**Betty, William Henry West** (1791-1874), boy actor, known as the 'Young Roscius,' was born in Shrewsbury. Consult his autobiographical *Life of Young Roscius* (1804), and *Hutton's Actors and Adresses of Great Britain and the United States*.

**Betul**, town and district, India, in the Central Provinces. Cotton and teak are produced. Area, 3,26 sq. m. Pop. 10,000.

**Betula.** See **Birch**.

**Betwa**, river, British India, rises in the Vindhya Mountains, Bhopal.

**Boulé, Charles Ernest** (1826-74), French politician and archaeologist, was born in Saumur. While teaching at the archaeological school of Athens, he discovered the propylaea of the Acropolis. He published *L'acropole d'Athènes* (1854), and numerous other works. Consult Ideville's *Monsieur Beule, souvenirs personnels*.

**Beust, Friedrich Ferdinand, Count von** (1809-86), German and Austrian statesman, was born in Dresden. In 1866, on the invitation of the Emperor Francis Joseph, he became minister of foreign affairs for Austria, and at once began a complete reorganization of the Austrian Empire. Beust's *Memoirs* have been translated into English, with an introduction by Baron Henry de Worms.

**Beuthen**, town, Prussia, in Upper Silesia. There are a good Rathaus, a 16th century church, and an old timber church; p. 117,321.

**Beveland, North and South**, two islands of the Netherlands, in the province of Zeeland, lying in the estuary of the Scheldt. The chief town is Goes.

**Beveridge, Albert Jeremiah** (1862-1927), American senator and author, was born on a farm at the junction of Adam and Highland counties, Ohio. He gained a wide reputation as a public speaker, and was U. S. Senator (Republican) from Indiana (1899-1911). His biography of John Marshall received the Roosevelt Medal in 1923 as 'a valuable contribution to history.' He wrote also a brilliant though unfinished life of Abraham Lincoln (1928).

**Beveridge, Sir William Henry** (1879-), Eng. economist. As chairman of Interdepartmental Committee on Social Insurance and Allied Services he brought out, 1942, 1944, social security plans for Great Britain.

**Beverley**, market town, England, in East Riding, Yorkshire. The twin-towered church of St. John is one of the finest ecclesiastical buildings in England; p. 13,469.

**Beverley, Robert** (1675-1716), American historian, b. in Virginia. He wrote a *History of Virginia*, a work of great value.

**Beverly**, city and seaport, Massachusetts, Essex co. Fishing and navigation employ a large number of the inhabitants; p. 28,884.

**Bevin, Ernest** (1884-1951), British statesman and labor leader. As a young man he was a truck driver and became an officer in the Transport and General Workers' Union. In 1940 he became Minister of Labor and was in the war Cabinet. The following year he headed the production division of the post-war government agencies. In the Attlee Cabinet of 1945 he was Foreign Secretary and he took a prominent part in the peace conferences of 1945-49. Lord Privy Seal, 1951.

**Bewick, Thomas** (1753-1828), English wood-engraver, who revived the art, first attracting notice in 1775, and brought it to a perfection which it had never previously attained. His woodcuts are much prized by collectors.

**Beyle, Marie Henri** (1783-1842), French author, known under the pseudonym of 'Stendhal', was born at Grenoble. In 1831 his greatest novel, *Le Rouge et le Noir*, appeared; and in 1839 *La Chartreuse de Parme* brought him additional fame. His writing is brilliant, morbid, and cynical; but the plots of his novels are weak.

**Beyrich, Heinrich Ernst** (1815-96), German geologist and palaeontologist, born at Berlin. He published the geological chart of Germany, due in great part to his labors.

**Beyrout.** See **Beirut**.

**Beyschlag, Wilibald** (1823-1900), German evangelical writer, and professor of theology at Halle (1860-1900). He published numerous works, including *Die Christologie des Neuen Testaments* (1866).

**Beza, Théodore, or De Bèze** (1519-1605), Geneva reformer, was born at Vezelay. The consummate tact with which he conducted negotiations on behalf of the oppressed Vaudois, or Waldenses, in 1557 and 1558, led to his appointment as representative of the Protestants at the conference of Poissy (1561). To him the Huguenots owed the final revision

of their Bible. See H. M. Baird's *Life of Beza* (1899).

**Bezant**, in heraldry, one of the charges called roundels; is a small disk of gold.

**Bezants**, the coins of the Byzantine empire, but specially the gold bezant (*bisancium*, *nummus aureus* or *solidus aureus*), struck between 395 and 1453, and varying in value between ten shillings and twenty shillings for the gold piece, and between one and two shillings for the silver.



*Bezant of Manuel I.*  
(1143-1180)

**Béziers**, town, dep. Hérault, France. There are remains of a Roman amphitheatre. The crusade against the Albigenses resulted, in 1209, in the wholesale massacre of the inhabitants; p. 65,654.

**Béziue**, a card game in which the name *bezique* is applied to the occurrence in one hand of the knave of diamonds and queen of spades, may be played by two, three, or four persons, with two, three, or four packs of cards from which have been removed cards from two to six. The remaining cards rank in this order—ace, ten, king, queen, knave, nine, eight, seven. The objects of the play are to promote in the hand certain combinations of cards to which, on being declared, different scores attach; to win aces and tens; and to win the so-called last trick. See A. Howard Cady's *Bezique*.

**Bezoar**, a morbid concretion occasionally found in the stomach and intestines of ruminants (antelopes, llamas, chamois, wild goat, and domestic cattle), formed by lime or magnesium phosphate adhering to some foreign substance, or by a portion of undigested food.

**Bagavad Gita** ('The Song of the Blessed One') is the work of an unknown author, and the date of its inclusion in the *Mahabharata*, of which it forms part of book vi., is also unknown. The song inculcates that remarkable development of Hinduism called *bhakti*, the doctrine of faith. The poem has at all times exercised a powerful influence on the

hearts and minds of the worshippers of Vishnu. It has also been translated into English by Davies (1882) and Sir Edwin Arnold, *The Song Celestial* (1885).

**Bhagavatapurana**. See *Puranas*.

**Bhagirathi**. (1.) Branch of the Ganges, in Bengal, India. (2.) River in Garhwal state, India.

**Bhainaror**, town, and fort in Udaipur district, Rajputana, India, has vast ruins of ancient temples to Siva.

**Bhang**, **Bang**, or **Bangue**, the Indian name for the dried leaves of the hemp plant. An infusion gives the drink *hashish*, which produces a peculiar delirium, and catalepsy.

**Bhartpur**, or **Bhurtpore**, capital of the feudatory state of the same name, in Rajputana, India. The state has an area of 1,982 sq. m., and a p. of 626,665.

**Bhartrihari**, a Hindu poet who is believed to have flourished in the 1st century. He is the reputed author of the *Three Centuries* (*Satakas*) of Sanskrit apophthegms upon love, wise conduct of life, and renunciation of the world.

**Bhaunagar**, or **Bhavanagar**, chief town and port of the state of Bhaunagar, Kathiawar peninsula, Bombay, India; p. 102,851.

**Bhavabhuti**, a celebrated Indian dramatist of the 7th and 8th centuries, who, with Kalidasa and Harsha, completes the great dramatic trio. Three of his plays have survived—viz. the *Malati-madhava*, *Maha-vira-carita*, and *Uttara-rama-carita*. See Frazer, *Literary History of India* (1907).

**Bhaviśhyapurana**. See *Puranas*.

**Bhile**, an aboriginal tribe who inhabit the hilly tracts of the Vindhya range, Central India, and the jungles of Khandesh district, Bombay Presidency. They are a primitive, dark, sturdy race of hunters. They number nearly two millions.

**Bhopal**, chief town of the feudatory state of Bhopal, Central India; p. 75,228.

**Bhor**, a feudatory state, Bombay Presidency, India; area, 1,491 sq. m.; population 130,420.

**Bhotan**. See *Bhutan*.

**Bhuj**, capital of feudatory state of Kutch, Bombay Presidency, India; famed for its gold and silver articles; p. 10,000.

**Bhurtpore**. See *Bhartpur*.

**Bhutan**, or **Bhotan**, an independent state in the Eastern Himalayas. The government of Bhutan resembles that of Tibet, the supreme authority being divided between the Deb Raja, or the secular head, and the Dharma Raja, or the spiritual head of the state. The

Bhutanes are a hardy and industrious race, but poor and oppressed. The chief towns are Punakha, the winter capital, and Tasichozong, the summer capital. Pop. 300,000.

**Bhuvaneswar**, the temple city of Siva, Bengal Presidency, India. It was the capital of the Kesari or Lion dynasty of Orissa (500-1104 A.D.) and contains the ruins of five or six hundred shrines.

**Biafra, Bight of**, large and deeply indented bay on the w. coast of Africa, between the mouth of the Niger and Cape Lopez (400 m.). It receives the Niger, Old Calabar (Cross and Calabar), Rio del Rey, and other rivers.

**Blanchini, Francesco** (1662-1729), Italian astronomer, was born in Verona. He is remembered chiefly for his tracing of the meridian.

**Bianco, or Bianco, Andrea**, Italian cartographer, was born in Venice early in the 15th century. He left a collection of hydrographical charts, in one of which, dated 1436, two islands are placed to the w. of the Azores. This fact has been regarded as indicating a knowledge of the Americas prior to Columbus' voyages.

**Biard, Francois** (1798-1882), French painter, was born in Lyons. His subjects were derived from travels in various lands, as Syria and Egypt (1833), Gold Coast of Africa, Greenland and Spitzbergen (1839), and Brazil (1858).

**Biarritz**, (Basque 'the two rocks'), famous French winter and summer seaside resort. Napoleon III. and his family did much to make the place famous and it was a favorite resort of Edward VII. of England; p. 22,022.

**Bias** (c. 550 B.C.), of Priene, in Ionia, was famous as one of the Seven Wise Men of Greece.

**Bib, Pout, or Brassy** (*Gadus luscus*), a small fish, allied to the haddock, found in the North Sea and the Arctic Ocean.

**Biban-el-Muluk**, valley, Upper Egypt. It contains tombs of ancient kings (18th, 19th and 20th dynasties).

**Bibbiena, Cardinal** (1470-1520), Italian prelate and comic writer, whose real name was Bernardo Dovizio, but who was generally called Bibbiena from his birthplace. He was made cardinal (1513) by Leo X., and became a great patron of art and learning. He is the author of what is generally regarded as the earliest regular Italian comedy, the *Calandria*.

**Bibiri**. See **Greenheart**.

**Bible**. The word 'Bible' comes from the Latin *biblia*, meaning 'little books.' The Old Testament, omitting the Apocrypha, is written in Hebrew, with the exception of a few scat-

tered passages. No ms. of the Old Testament is reckoned to be earlier than the 9th century A.D., and it has been thought that those mss. which are extant are all descendants of a common ancestor not earlier than the 2d century A.D. The three versions are those in the Greek, the Syriac, and the Latin. Of the Greek by far the most important is the *Septuagint*, which was produced in Egypt from about 300 B.C. to 150 B.C. As a translation it is of unequal excellence, but as it is the oldest translation of the Hebrew Bible, and as all the other early translations are made from it, with the exception of the Peshito Syriac and Jerome's Vulgate, its study is of prime importance. It is constantly quoted by the writers of the New Testament.

The principal Syriac version, the Peshito (which means either *simple* or *vulgate*), was made (2d century) direct from the Hebrew with occasional reference to the Septuagint.

The Old Latin, or *Itala*, was a literal translation of the Septuagint, made in the 2d century, A.D. The *Vulgate* is in the New Testament the revision of this, in the Old a translation of the Hebrew, made by Jerome in Bethlehem between the years 392 and 404 A.D.

The whole collection of books contained in the Bible is usually spoken of as the Canon, or canonical Scripture, any single book being said to be in the canon, or canonical.

It is probable that in Israel the first religious documents were collections of laws to be used by the priests in the instruction of the people, and records of events which had influenced the national consciousness. Later on, the prophets, or their amanuenses, wrote down the discourses they had delivered in God's name. But the first approximation to what we call the canon seems to have been the law-book, believed to have been Deuteronomy, found in the temple in the reign of Josiah, which was immediately acknowledged by king, prophets, priests, and people as an authoritative record of religious law. It cannot be determined when the other elements of the Pentateuch were composed, but it would seem that all the parts were gathered in one collection by Ezra between 444 and 400 B.C., and accepted by the people as an exhaustive record of the *Law* (*Torah*), the first great division of the canon. But by this time the chief historical books were written, as well as the greater part of the prophetic books; and precisely to such books the attention of the thinking part of the nation turned for knowledge of the past history, and for instruction and consolation in their present position. Accordingly, we find

that the books which, in the Hebrew Bible, immediately follow the Pentateuch are the books of Joshua, Judges, Samuel, and Kings, which give a connected history of the nation from the death of Moses to the Babylonian captivity; and then, with the exception of Daniel follow all the books which we call prophetic.

The canon, containing precisely the books now found in the Old Testament, was, according to the Talmud, ratified by the Council of Jabnia, *c.* 90 A.D. Three great divisions, frequently referred to in the New Testament, in varying phraseology, mark the three stages by which the collection assumed its final form. The total number of books, according to Jewish enumeration, is twenty-four, so that the whole Hebrew Bible is sometimes spoken of as 'the four and twenty.'

Between the last Old Testament writing and the rise of the New Testament literature there intervened about one hundred and fifty years. Although this period is a blank so far as contributions to the canonical Scriptures are concerned, there was really no cessation in the literary activity of the people. But the religious productions of this time, though indispensable for the history of Judaism, and not without value for devotional purposes, manifest neither the lofty genius of the preceding literature, nor the inspired glow of that which was to follow. For this and for other reasons, not the least being that they were (mainly) written in Greek, the Jews never invested them with canonical dignity. They are known as the Apocrypha of the Old Testament.

The New Testament is a collection of twenty-seven distinct writings, from eight (or more) different hands. The books are usually classed as Historical (five), Didactic (twenty-one), Prophetic (one), though the writings of the first class include much more than one-half of the entire matter. The unity of the whole is remarkable: all the books find their center in Jesus Christ. The four gospels narrate His life on earth; the fifth historical book tells how the new life, that came from Him through the Holy Spirit, passed from Jerusalem to Rome. The epistles, written by men of varied personal character and temperament, among whom by far the most prominent and the most fertile was the apostle Paul, set forth the significance of the gospel facts as revealed to them according to our Lord's promise. The single prophetic book (the Revelation of St. John, or the Apocalypse), however it is to be interpreted, shows the Lamb as King, to

become victor on earth, where His church is preparing through conflict to share His triumph. See also GOSPELS and PAUL.

The New Testament is written entirely in the Greek language. The existence of a number of various readings in the text of the New Testament necessitates an inquiry into the materials from which the text is derived, and into the causes which have produced the divergent readings. Here again there are three sets of versions, the Syriac, Latin, and Egyptian, each of which is supposed to go back in some form to the 2d century.

New Testament scholars are constantly at work on comparison of details in one and another of the many versions, especially as new facts are being found out each year through important archaeological discoveries in Palestine and other regions of the Near East.

Concerning the New Testament Canon, previous to the middle of the 2d century after Christ, the church found its final authority in the scriptures of the Old Testament and in the words of Jesus. Various gospels were already in circulation, and there seems to have existed also a large mass of oral tradition regarding the teaching and work of Jesus; and both written and verbal material was used as the source of information and doctrine. But the apostles having been long dead, as also most of those who had known them, the church began to feel the need of a better defined and a more stable standard of religious truth. This was found in the four gospels, Matthew, Mark, Luke, and John: these accordingly were declared to have authority as Scripture, and to be worthy of co-ordination with the Old Testament. This canon of the gospels had received universal recognition before the close of the 2d century. The second stage, the canonization of the epistles, etc., followed almost immediately, though many years elapsed ere the church reached unanimity regarding some of them. The conditioning circumstance of the rise of an accredited collection of the epistles was the spread of heresy, particularly of Gnosticism, within the church. To combat this it was found necessary to make appeal to the apostolic teaching regarding Christ, and as this had, unsystematically but with wonderful fullness, been set forth in letters, etc., from various men of apostolic standing, a collection of these was made, and their regulative character declared. Considerable doubts existed at first about the admission of certain books—Hebrews, the Apocalypse, and some of the smaller epistles—as it was questioned whether these were from apostolic hands; but by A.D.

200 something like unanimity was reached, and the New Testament nearly as we have it became the accepted standard of the whole church.

Coming to the English Bible, while portions of Scripture were translated into Anglo-Saxon as early as the 8th century, the first complete rendering into what may be called English was made by Wycliffe about 1382. It is, however, to Wm. Tyndale that we owe the first printed Testament, issued at Worms in 1525. Tyndale translated also the Pentateuch, printed in 1530. The first complete printed English Bible was that of Miles Coverdale, a folio volume of the highest bibliographical value, printed in 1535, probably at Zurich, and based upon the Swiss-German edition (6 vols. Zurich, 1527-9). Next we have Matthew's Bible (1537), which largely utilizes the versions of Tyndale and Coverdale. Taverner's Bible was printed in London in 1539, whole as a folio, in parts as a quarto, that the poor might purchase portions of the Bible. The Great Bible (so named from the large size of its pages) was prepared at the suggestion of Cromwell, Earl of Essex, and finally issued from London in 1539. The Geneva Bible (often called the 'Breeches Bible,' from its rendering of Gen. 3:7), the work of Wm. Whittingham and others, with notes of a distinctly, even aggressively, Calvinistic trend, was issued in 1560, and was held in high favor for three-quarters of a century thereafter. The Bishops' Bible (called also the 'Treacle Bible,' from its translation of Jer. 8:22) was executed, as a kind of offset to the last named, under the supervision of Archbishop Parker, and published in 1568. Then came the Catholic Rheims New Testament (1582) and the Douay Old Testament (1609). It is an interesting fact that some of these Bibles were the finest specimens of the early printing art.

Meanwhile, in consequence of the Hampton Court Conference of 1604, the preparation of what is now known as the Authorized Version was in progress. The Bishops' Bible was adopted as its basis, but most of the above-named translations, particularly the Rheims and the Geneva, were made use of, and the work was finally given to the public in 1611. This edition has exercised an outstanding influence on English thought and literature, and might well have been considered final, had not the recent science of textual criticism shown that its Greek original was itself frequently unsound. This fact, together with the admitted want of uniformity in its language, led

scholars to propose a further revision; and when the House of Convocation in 1870 sanctioned the proposal, steps were immediately taken to carry it out. Scholars representing widely different sections of the church were invited to take part in the work, and at length, in 1881, the Revised New Testament was issued, the Old Testament following four years later. Interesting particulars regarding the methods and labors of the revisers are given in the published prefaces to their work.

Of Bibles printed in America the following are the most noteworthy. The Eliot Bible, translated by John Eliot for the Indians of Massachusetts; the New Testament, appeared 1661, the complete Bible, 1663, 2d ed., 1685. A Bible for the Germans of Pennsylvania, repeating Luther's version, was printed by Dr. C. Saur in Germantown, 1743. The first Bible in the English language printed in America was the Aitken Bible, Philadelphia, 1782, the only copy known being in the British Museum. An edition of the Douay version appeared in Philadelphia, 1790.

The latest standard revised versions of the Bible in English are *The American Standard Revised Bible* (1901) and *The Revised Standard Bible*. 2 vols. (1946-52). The most noteworthy independent English translations are *The Complete Bible, an American Translation*, ed. by J. M. P. Smith and E. J. Goodspeed (1923-38; repr. 1939) and *The Holy Bible*, tr. by James Moffatt. 3 vols.

**Literature.**—The literature in all departments of Biblical study is enormous, and additions are constantly being made. Germany, perhaps, takes the lead in productivity, but England (with America) has been making giant strides of late. We can only indicate a few of the most prominent or most accessible books. General.—Bible Dictionaries by Smith, Hastings, and Cheyne and Black. See also Goodspeed, E. J., *The Story of the Bible* (repr. 1936); and Herklots, H. G. G., *How Our Bible Came to Us* (1954).

**Bible Christians.** See **Methodism**.

**Bible Societies**, societies formed for the printing and distribution of the Bible. Their characteristics are that they are voluntary associations, non-ecclesiastical, non-sectarian, Protestant, and benevolent. The first Bible Society was the Canstein Bible Institute, in the Orphans' Home in Halle, founded by the Marquis of Canstein in 1710, which distributed, before 1719, 40,600 Bibles and 100,000 New Testaments. The British and Foreign Bible Society was founded in 1804, and is the

largest in the world. It has 1,200 auxiliaries and branches, with upwards of 3,000 Bible associations.

The American Bible Society was the result of a concerted movement by a number of existing societies. The earliest of these were organized in Philadelphia, 1808, Hartford, Conn., Boston, New York, and Princeton, N. J., 1809. In 1816, delegates from thirty-five societies, those just mentioned among them, met in New York and organized the American Bible Society, to which the societies already existing became auxiliary. Through the efforts of these societies and the great missionary boards, the Bible has been translated into about 500 languages. It holds its own always as the best-selling English book.

**Biblia Pauperum**, or **Poor Men's Bible**, the name given by modern writers to a series of medieval picture books containing illustrations of events in the life of Christ, with a small amount of explanatory text in rhyming Latin verse. See also **Block-books**.

**Bibliography**, a term from the Greek which means 'the writing of books,' and used in the 17th century in England in this sense, the word bibliography was reintroduced in the early years of the 19th century to denote the writing, not of books, but about books. One school of bibliographers, whose interests are reflected in the publications of the Bibliographical Society, which has its headquarters in London, the Edinburgh Bibliographical Society, etc., the Grolier Club of New York, etc., concerns itself chiefly with the accidents of the production of books—the history of hand-writing, of printing, bookbinding, paper-making, bookselling, publishing, book illustrations, book-collecting, book plates, book stamps, and kindred topics. Information on each of these subjects is given under its own heading. No very good general treatises on them exist, but reference may be made to the publications of the societies already named.

In the sense in which it concerns itself chiefly with the matter of books as opposed to their form, bibliography aims at enumerating all the books of a given author or group of authors, or those published in a given period, or in a given country, province, county, or town, or those dealing with any given subject, or such selected books as may be especially useful to students of such subject or subjects. Information as to special bibliographies of this kind will here be found under the articles that deal with the subjects to which they refer.

**Bibliomancy**, divination by means of opening the Bible and noting the first passage

which the eye lights on, or by entering a church and observing the first words of the Bible which are heard. It was in extensive practice for centuries, especially in the case of the election of bishops.

**Bibliothèque Nationale**, the great library and museum in Paris. The magnificent edifice in which it is now housed was put up under the direction of Labrousse (1854-75). It includes five departments—(1) printed books; (2) manuscripts; (3) prints, etc.; (4) maps; (5) coins and medals. Of printed books there are more than 2,500,000, and the number grows by about 70,000 annually; of mss. there are more than 100,000; of prints, etc., over 300,000; and of coins and medals, about 200,000.

**Bicarbonate**. See **Carbonates**.

**Biceps** ('two-headed'), as generally used, the muscle on the front of the upper arm, which flexes the elbow, and which has two separate attachments above. This is the *biceps flexor cubiti*.

**Bichat, Marie François Xavier** (1771-1802), French anatomist and physiologist. He did much to systematize the study of anatomy and physiology.

**Bichir**. See **Polypterus**.

**Bichloride of Mercury**. See **Corrosive Sublimate**.

**Bichromate Cell**. See **Cell, Voltaic**.

**Bickerstaff, Isaac**, a pseudonym used by Dean Swift when he burlesqued Partridge, the almanac-maker, in 1709. Steele also used the name, in the *Teller*.

**Bickerstaffe, Isaac** (c. 1735-1812), Irish dramatist. His most successful works were *Love in a Village* (1762), a comic opera; and *Maid of the Mill* (1765), an after-piece.

**Bickerstaffe-Drew, Count Francis Browning Drew** (1858-1928), English Roman Catholic prelate and author, was born in Headingly, Leeds, and was ordained priest in 1884. Under the pseudonym 'John Ayscough' he wrote: *Maroks* (1908); *French Windows* (1917); *Dobachi* (1923).

**Bickmore, Albert Smith** (1839-1914), American naturalist, was born in St. George, Knox co., Me. In 1869 he became superintendent of the American Museum of Natural History at New York.

**Bicycle**. See **Cycling**.

**Bidassoa**, a small stream entering the Bay of Biscay, divides France from Spain where the main line railway and road cross the frontier at Hendaye (Irun).

**Biddeford**, city, Maine, York co., on the Saco River. In the vicinity are great quarries



of fine granite, the product of which is an important export; p. 20,836.

**Bidding Prayer**, a formula of public prayer, contained in the oldest Greek, Gallican, and English liturgies, in which the priest details what the congregation is to pray for, ending with the Lord's Prayer. Consult Dearmer's *Everyman's History of the Prayer Book*.

**Biddle, Francis** (1886- ), American lawyer, born in Paris, France. He was attorney general of the U. S. (1941-45).

**Biddle, James** (1783-1848), American naval officer, was born in Philadelphia, Pa. He negotiated the first treaty of the United States with China, 1846.

**Biddle, John** (1615-62), 'the Father of English Unitarianism,' was the son of a tailor of Wotton-under-Edge, Gloucestershire. Consult *Life* by Toulmin.

**Biddle, Nicholas** (1786-1844), American financier, was born in Philadelphia, Pa. He was appointed (1819) by President Monroe government director of the United States Bank, succeeding in 1822 to its presidency, a position which he held until President Jackson's attack upon the bank brought about his resignation in 1830, and the bank's failure in 1841.

**Bideford**, seaport town, England, in Devonshire. It was the birthplace of Sir Richard Grenville (of Tennyson's *Revenge*), and here Kingsley wrote part of his *Westward Ho!*; p. 10,100.

**Bidens**, a genus of composite plants found in wet soil, or swamps, throughout the United States.

**Bidpai**, otherwise **Pilpay**, **Baidaba**, and **Sendebar**, the reputed author of a collection of apologues, known as *The Fables of Bidpai*.

**Biele, Wilhelm, Baron von** (1782-1856), German astronomer, was born in Rossia, Prussia, near Stalberg, in the Harz Mountains. He entered the Austrian army, but devoted his leisure to the study of astronomy, and discovered, on Feb. 28, 1826, the comet to which his name was given.

**Bielefeld**, town, Germany, in Westphalia, at the foot of the Teutoburger Forest. Bielefeld is the centre of the Westphalian linen industry; p. 158,111.

**Bielski, Marcin** (1495-1576), Polish historian, the first to write history in the Polish language. Chief works: *Universal History* (1550); *History of Poland* (1597).

**Biennials**, in gardening, are strictly flowering plants that do not flower until the year following that in which they emerge from their

seed coverings, and do not live beyond the year in which they first flower.

**Bienville, Jean Baptiste le Moyne** (1680-1768), French explorer, born in Montreal. See **LE MOYNE**.

**Bierce, Ambrose** (1842-1914?), American author, born Ohio. He was brevetted major for distinguished services in the Civil War. He was editor of the *Argonaut* and *Wasp* (1877-84), and contributed to various periodicals in London and California, including *Fun*, *The Overland Monthly*, and the San Francisco *Examiner*. Among his published works are: *Cobwebs from an Empty Skull* (1874); *The Devil's Dictionary* (1906).

In 1914 Bierce went to Mexico and there vanished. The mystery of his disappearance never has been solved. A former soldier in the force of Pancho Villa said Bierce had joined that organization, was fatally wounded in an encounter with Mexican Federal troops and buried in the Mexican desert. Other accounts say he was executed by Villa's order after criticizing the bandit chief's military tactics, that he committed virtual suicide by walking unarmed into the Federal fire, and that he chose to remain alive in the jungles of Brazil.

**Bier's Congestion Treatment**, a method of treatment, introduced by the distinguished surgeon, August Bier of Bonn. The basis of the treatment is the production of obstructive hyperaemia, brought about usually by the application of a tight rubber bandage to the part.

**Bierstadt, Albert** (1830-1902), American painter, was born in Dusseldorf, Germany.

**Biesbosch**, (i.e., 'rush bush' or 'rush land'), a district of the Netherlands, lying between the provinces of South Holland and North Brabant.

**Bifrost**, or **Aasbro**, in Scandinavian mythology, the bridge between earth and heaven over which the gods daily pass to Doomstead, the hall of the Fates, and the judgment seat under the mystic ash tree Yggdrasil.

**Bigamy**, in modern law, consists in the contraction of a second marriage while a pre-existing one remains undissolved. See **MARRIAGE**; **NULLITY OF MARRIAGE**; **DIVORCE**.

**Big Ben**, an immense bell weighing 13 ½ tons in the Westminster Clock Tower, London, England.

**Big Bethel**, village between the York and James Rivers, Virginia, the scene of one of the early struggles of the Civil War.

**Big Black River**, rises in Webster co.,

Mississippi, flows in a general southwesterly direction, and enters the Mississippi River at Grand Gulf. Length, 260 m.

**Big Blue River**, rises in Nebraska, flows south, dividing Riley and Pottawatomie cos., and joins the Kansas River at Manhattan. Length, including branches, about 300 m.

**Big Brother Movement**, a movement founded in 1904, in New York City, by Ernest K. Coulter. The basic idea is similar to that underlying juvenile probation (see PROBATION), the object being to supplement the work of salaried probation officers by volunteer workers, each playing the part of a big brother and adviser to some unfortunate boy.

**Bigelow, Frank Hagar** (1851-1924), American meteorologist, was born in Concord, Mass. He was affiliated with several American universities, served on various meteorological expeditions and commissions, and published valuable articles and monographs on meteorological subjects.

**Bigelow, John** (1817-1911), American author, journalist, and diplomat, was born in Malden, N. Y. In 1849 he became joint proprietor with William Cullen Bryant of the New York *Evening Post*, of which he was managing editor until 1861. He was U. S. consul-general at Paris (1861-4) and U. S. Minister Plenipotentiary to France (1864-7). He was a member of the American Academy of Arts and Letters. Among his publications are: *France and the Confederate Navy*, 1862-8 (1888); *Life of William Cullen Bryant* (1890).

**Bigelow, Maurice Alpheus** (1872), American biologist and educator, was born in Milford Center, Ohio. His published works include: *Teaching of Zoology in the Secondary School* (1904); *Introduction to Biology* (with A. N. Bigelow, 1913).

**Bigelow, Melville Madison** (1846-1921). American legal writer, born in Eaton Rapids, Mich., was lecturer in the law department of the University of Michigan, and in the Northwestern University Law School, and dean of the Boston University Law School. His published works include: *History of English Procedure* (1880); *The Law of Wills* (1898).

**Bigelow, Poultney** (1855-1954), Amer. author, historian and traveler, was born in N.Y. City. He four times circumnavigated the globe in his search for political and sociological data. During the Spanish-American War he was correspondent of the London *Times*. He was widely known as a friend of former Kaiser Wilhelm of Germany, whom he visited at Doorn annually. Mr. Bigelow's father John Bigelow, was Ambassador to

France in the administration of Abraham Lincoln. Some of his books are: *White Man's Africa* (1897); *Children of the Nations* (1901); *Prussian Memories, 1864-1914* (1914).

**Big Game Hunting**. See **Hunting**.

**Biggarsberg Mountains**, range of South Africa, branching east from the Drakenberg Mountains.

**Big Hatchie River**, rises in Northeast Mississippi, and flowing north into Tennessee, enters the Mississippi 40 m. above Memphis. Length, 200 m.

**Bighorn**, or **Rocky Mountain Sheep** (*Ovis canadensis* or *cervina*), a wild sheep of North America.

**Big Horn Mountains**, a range in Northern Wyoming, part of the Rocky Mountains, running in a northwesterly and southeasterly direction, about 180 m. in length.

**Big Horn River**, rises as Wind River in the Wind River Mountains, Wyoming, and flows nearly north to its junction with the Yellowstone. It is about 450 m. long.

**Biglow Papers**. See **Lowell, James Russell**.



*Bignonia speciosa*.

**Bignonia**, a genus of American evergreen climbers of the family Bignoniaceae. The bignonias are mostly tropical, and are characterized by a profusion of large, showy flowers. The leaves are opposite, usually compound, and the seeds are winged.

**Bigod**, the name of a family founded by a Norman knight, which acquired the earldom of Norfolk in the reign of Stephen.

**Bigorre**, former subdivision of Gascony, now the department Hautes-Pyrenees, France.

**Big Sandy River**, also called **Chatterawah**, is a navigable affluent of the Ohio, formed by the junction of two branches which rise in Virginia.

**Big Sioux River**, a tributary of the Missouri River. Heading in the n.e. part of South Dakota, it flows south, forming the boundary between South Dakota and Iowa in its lower course, and joins the Missouri 2 m. above Sioux City, Ia. Length, about 300 m.

**Big Trees**. See **Sequoia**.

**Bihar**, county, Eastern Hungary, bordering on Klausenburg in Transylvania.

**Bijanaghur**. See **Vijayanagar**.

**Bijapur**, town, Bombay Presidency, India. It was until 1686 the capital of a powerful Mohammedan kingdom. It became British in 1848; p. 25,000.

**Bikini Atoll**, 240 miles north of the Marshall Islands, in the Pacific Ocean, was used as an atomic bomb target, 1946.

**Bilbao**, city, capital of Vizcaya province, Spain; the center of a great iron district; p. 230,507.

**Bilberry**. See **Huckleberry**.

**Bilbilis**, town of ancient Spain, famous as the birthplace of the poet Martial, and for the manufacture of the finest sword-blades and other steel weapons used by the Roman and Carthaginian armies.

**Bilboes**, fetters fastened to a bar of iron, carried by the Spanish Armada for using upon the men of the English fleet.

**Bilderdijk**, **Willem** (1756-1831), Dutch poet, born at Amsterdam; he left ninety volumes. The chief are *Buitenleven* ('Rural Life'), *Die Ondergang der Eerste Wereld* ('Destruction of the First World'), in 1809.

**Bile** is the secretion from the liver, and is discharged into the duodenum. Bile contains certain salts, taurocholate and glycocholate of soda, which are of special service in the emulsification, solution, and diffusion of fatty substances in the food. See also **DIGESTION**; **LIVER**; **BLACKWATER FEVER**; **JAUNDICE**.

**Bilge** (sometimes spelled **Bulge**) is the part of the bottom of a ship nearest to the keel, and always more nearly horizontal than vertical. The name *bilge water* is given to water which finds its way into the bilge or lowest part of a ship.

**Bilharzia**, a genus of trematodes or flukes, including in *B. haematobius* a dangerous para-

site of man, which has been prevalent in Egypt since very early times. It infests the abdominal and urinary blood-vessels, and causes haematuria, inflammation, and so on.

**Biliary Calculi**. See **Gall Stones**.

**Bilimbi**. See **Blimbing**.

**Billousness**, a popular term for a form of gastric duodenal catarrh characterized by nausea, retching, and sickness, with vomiting of bile.

**Bill**, or **Beak** of birds, consists of an upper and under jaw, clothed in a horny sheath, sometimes undivided and sometimes composed of several pieces. See **BEAKS**.

**Bill** is derived from the Latin *bullā*, 'a seal,' and in its original sense means a document under seal. Documents under the papal seal are called 'bulls.' The word is now used in a variety of senses, both in politics and law.

In legislative proceedings, a bill is a formal proposal for legislation properly submitted to a legislative body under its rules.

**Bill**, in equity practice, is a statement of complaint addressed to the court, praying for relief from the unjust acts of the defendant and for proper process.

*Bill* is also a common expression for the two more usual kinds of negotiable instruments, bills of exchange and promissory notes. See **BILL OF EXCHANGE**; **BILL OF LADING**; **BILL OF SALE**; **NEGOTIABLE INSTRUMENTS**; **PROMISSORY NOTE**.

**Billaud-Varenne**, **Jean Nicolas** (1756-1819), French revolutionist, born at La Rochelle. With Tallien and Vadier he destroyed the dictator Robespierre (1794). His genuine *Memoires* were issued by Begis in 1893.

**Billet**, in architecture, an ornament belonging to the Norman style. It was formed by cutting a moulding—generally a round moulding—into notches, so that the parts left resembled billets of wood.

**Billet**, in heraldry, a small brick-shaped charge.

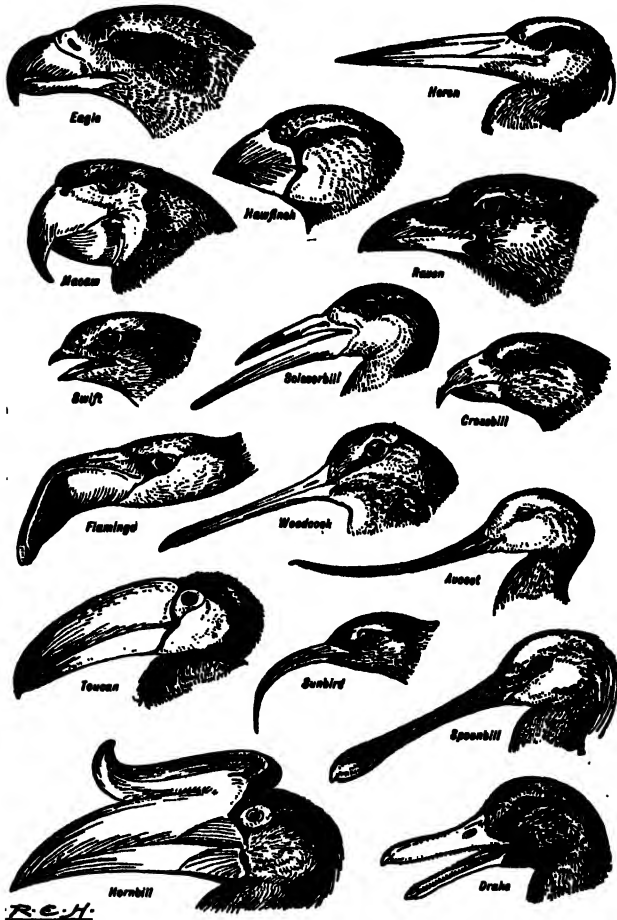
**Billeting**, the compulsory quartering of troops on the civil population. In Great Britain at the beginning of the 17th century billeting was regarded as one of the chief popular grievances. In the United States, billeting is restricted by the Constitution, the Third Amendment of which provides that 'no soldier shall, in time of peace, be quartered in any house without the consent of the owner, nor in time of war, but in a manner to be prescribed by law.'

**Billiards**. The origin of billiards is not clearly established. Originally the game was played with only two balls. About 1775 the

third ball was introduced by the French, and called a carrom, and later a fourth ball was added, but the change did not become popular, except in England, and at present the three-ball game is practically the only one played in America and France. It is played on a pocketless table, whose standard measurements are

In addition to the three-ball game, there are the balk-line and cushion-carom games which are preferred by the more skilled professional and amateur players. See *Pool*. Consult Hoppe, W., *Billiards As It Should be Played*.

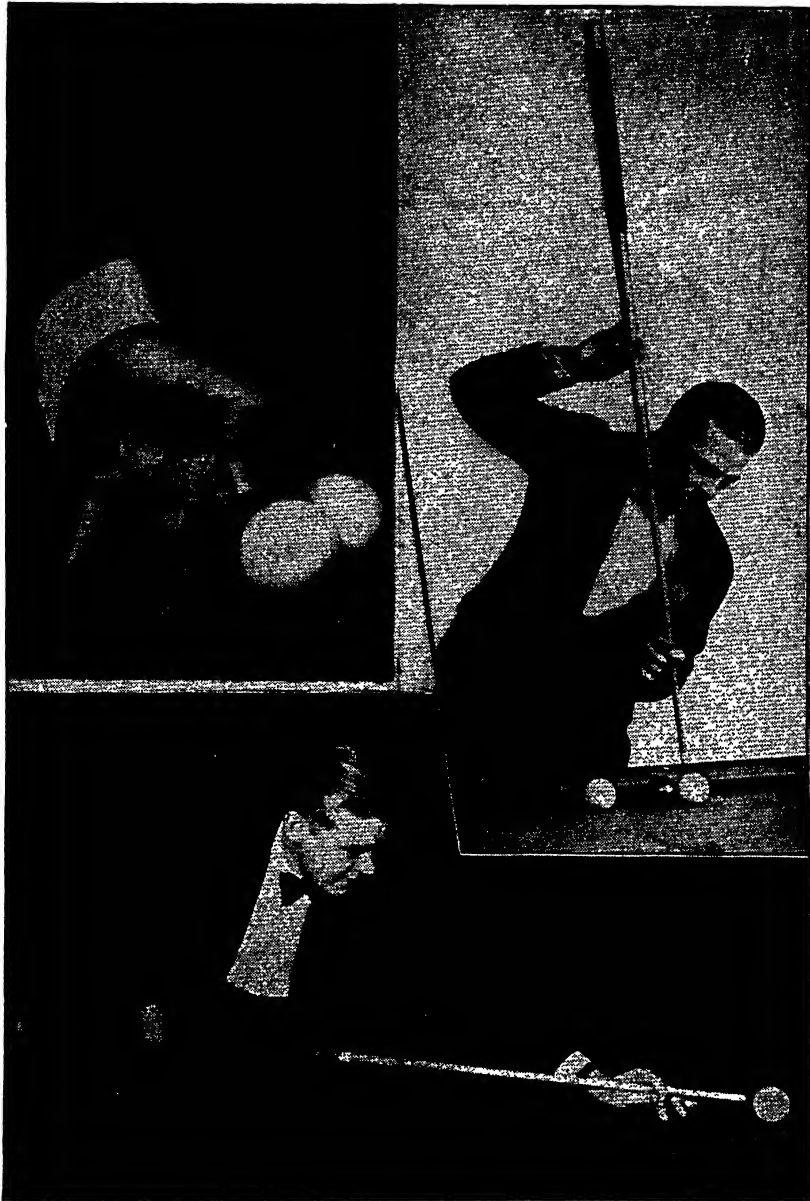
**Billings, John Shaw** (1839-1913), American surgeon and librarian, was born in Switzer-



*Bills or Beaks: Characteristic Forms.*

10 by 5 ft. Three ivory balls,  $2\frac{3}{8}$  or  $2\frac{1}{4}$  inches in diameter, are employed; two of these balls are white (one with a small black spot, to identify it), and the other is red. A cue (made from wood) is used to propel the balls about. The cue varies from  $4\frac{1}{2}$  to 5 ft. in length, is about  $\frac{1}{2}$  inch in diameter at the tip and weighs from 14 to 22 ounces.

land co., Ind., was connected with the Surgeon-General's office at Washington, for whose library he prepared the *Index-Catalogue*. He supervised the vital and social statistics of the Eleventh Census. He was made director of the New York Public Library in 1896. He was also medical adviser to the board of trustees of Johns Hopkins University; and a



**Billiards.** Upper left and upper right, Professional Masse Strokes; lower, The Correct Position.

frequent lecturer at Yale, Harvard, Columbia, Johns Hopkins.

**Billings, Josh.** See Shaw, Henry W.

**Billings, William** (1746-1800), American composer, was born in Boston, Mass. He introduced into New England a spirited style of

church music. Among his works are: *The New England Psalm Singer*, or *American Chorister* (1770), *Psalm Singer's Amusement* (1781).

**Bill of Adventure**, a writing under the hand of a shipper of goods or a common carrier, showing that the shipment is the ven-

ture of another person, and that the shipper or carrier is responsible for nothing more than delivery of the cargo as consigned.

**Bill of Attainder.** See **Attainder**.

**Bill of Costs**, an account of fees and other disbursements incurred by an attorney in a suit or other legal proceeding conducted by him. Costs of a litigation are usually prescribed by statute or by a rule of court; and when, as is usually the case, they are ordered to be paid by the defeated party, the bill of costs must be 'taxed,' or approved, by the clerk of the court in which the judgment was rendered. See **COSTS**.

**Bill of Exceptions** is a statement in writing of objections taken to the ruling of the court upon a point of law arising in the course of the trial. See **APPEAL**.

**Bill of Exchange** is defined as 'an unconditional order in writing addressed by one person, called the drawer, to another, called the drawee or addressee, signed by the person giving it, requiring the person to whom it is addressed to pay on demand or at a fixed or determinable future time a certain sum in money to or to the order of a specified person (called the payee, who may be either the drawer himself or a third party) or to bearer.' The origin of this, perhaps the most important of all commercial instruments, is involved in obscurity. By Montesquieu and others it is attributed to the Jews, who, when banished from France and England in the 13th century, employed bills of exchange as a method of recovering the effects which they had perforce left behind them. By others the Venetians and Florentines are credited with the invention.

Money alone can be made the subject of a bill or note; an order to deliver so much merchandise would be useless. The sum in question also requires to be certain. A bill must be imperative in its terms, payment must be required as a right, not merely as a favor. Acceptance can only be made by the drawee, and his signature alone, without further words, is sufficient. Bills and notes payable to order can be transferred only by endorsement; but if payable to bearer, mere delivery is sufficient. If, however, the transferee of a bill payable to order gives full value for it, he acquires such right as the transferrer had in the instrument.

An endorsement to be valid must be written on the bill itself; or if there be not room enough, upon a slip of paper attached to the bill. Endorsements are frequently made without recourse, especially in the United States. This means that the endorser is under no lia-

bility in the event of bill eventually turning out to be worthless. If the drawee declines to accept the bill, or to make payment when it arrives at maturity, it is said to be dishonored.

**Bill of Health** is a certificate given to the master of a ship by the authorities of a port from which she sails, setting forth the condition of the place in regard to infectious diseases, as at the date of departure. If a ship arrives at a port without a bill of health she will be detained in quarantine, just as if her bill were foul.

**Bill of Indictment** is a written accusation of crime preferred against one or more persons before a grand jury. See **INDICTMENT**.

**Bill of Lading**, the written instrument issued by a common carrier on taking custody of the goods to be transported by him. A bill of lading performs three functions: first, it is a receipt given by the carrier to the shipper for the goods delivered to him by the latter; second, it embodies the contract of carriage between them; third, it is a document of title to the goods shipped.

Bills of lading are governed by the *Federal Bill of Lading Act* (Pomerene Act), passed in August, 1916, and effective January 1, 1917. According to this Act, two kinds of bills may be issued—straight bills, when the goods are consigned or destined to a specified person, and order bills, when the goods are consigned to the order of any person named in the bill. He is not entitled to receive the goods, however, until he has satisfied the carrier's lawful lien for freight, storage, demurrage, terminal charge, and other expenses incident to transportation and delivery; has surrendered the bill; and has signed a receipt for the delivery of the goods.

All carriers are held liable for bills of lading duly issued and signed by their properly appointed agents. They are not liable for the quantity and quality of the shipment, in case of improper loading or misdescription of goods in the bill of lading, when such goods are loaded by the shipper and the bill states that it is the shipper's weight, load, and count. See **CARRIER**.

**Bill of Mortality** was a weekly return of the deaths occurring in the various parishes of the city of London prior to 1842 when modern registration systems were first used. See **LONDON**.

**Bill of Pains and Penalties.** A legislative bill introduced into the British Parliament, providing punishment for acts previously committed, whether such acts when committed were or were not prohibited by law. Bills of

Pains and Penalties being retroactive in their operation are prohibited in the United States by the provision of the Constitution (Art. I, Sec. 9). See **ATTAINDER**; **TREASON**.

**Bill of Rights, U. S.**, is the name given to the first ten amendments to the Constitution, which were finally ratified by the States in December, 1791.

**Bill of Rights** is the name commonly given to the statute in which is embodied the Declaration of Rights presented by the English Convention Parliament to the Prince and Princess of Orange in 1689. After declaring the late King James II. to have done various acts contrary to the laws of the realm, and to have abdicated the government, the Bill of Rights proceeds to enact in detail the celebrated declaration as to the rights and liberties of the English people. See **ENGLAND AND WALES, History**.

**Bill of Sale**, as originally understood, is a formal deed transferring personal property under a contract of sale, and this meaning still survives in the case of sale of ships, delivery of the deed being equivalent to actual delivery of the ship. By Act of Congress of 1793 a bill of sale, setting forth at length the certificate of registry, must accompany every sale or transfer of a registered ship to a citizen of the United States. Bill of sale is, however, now more commonly employed in a derivative sense to denote a deed or instrument operating a transference in security of a debt or other obligation.

**Bill of Sight** is a document signed by an importer of goods who is unable to make a perfect entry as to their quantity or quality. The best description possible in the circumstances is given, and the document serves as a warrant to the customs authorities to allow the goods to be landed. But a perfect entry must, however, be made before they are actually delivered to the importer. When bills of sight are used, the goods are liable to be sold if such entry is not completed within a specified time, usually a month.

**Billon**, a name (originally French) for a mixed metal sometimes used in coinage, consisting of gold or silver, with a large proportion of baser metal.

**Billot, Jean Baptiste** (1828-1907), French general and senator, born at Chaumeil; was twice appointed Minister of War; took a prominent part in the Dreyfus Affair of 1897.

**Billroth, Albrecht Christian Theodor** (1829-94), German surgeon, born at Bergen, on the island of Rugen. He was the first to

operate for cancer of the stomach, and to him is largely due the modern ambulance system. His works include *General Surgical Pathology and Therapeutics*; *Care of the Sick at Home and in the Hospital* (1892).

**Bilma**, the southern and most important portion of the Kavar oasis, Central Sahara, Africa; has rich salt mines.

**Bilney, Thomas** (d. 1531), English martyr, was born in Norfolk. He preached against the mediation of saints, was arrested and later put to death by fire.

**Biloxi**, a small Indian tribe, originally dwelling on Biloxi Bay, but afterward in Louisiana.

**Biloxi**, city, Harrison co., Mississippi. Its six-mile beach and excellent climate make it popular as a summer and winter resort. The chief business interests are the packing and shipping of oysters and shellfish, fruits, and vegetables; p. 37425.

**Bilse, Oswald Fritz** (1878), a lieutenant in the German army, born at Kern; wrote *Life in a Garrison Town*.

**Bimetallism**, a monetary system in which there is free coinage of gold and silver at a fixed ratio, the coins of either metal being legal tender, as opposed to monometallism, in which one metal alone has the right of free coinage.

Two chief advantages are claimed for bimetalism. One is the maintenance of a par of value between the two metals, and a consequent steadiness of exchange between gold-using and silver-using countries. A second advantage claimed for bimetalism rests on the argument that a joint standard is likely to be more stable than a single standard. On the other hand, it is argued that bimetalism presents more complications and is more artificial than monometallism.

Consult R. Griffin's *Case Against Bimetallism*; Darwin's *Bimetallism*; White's *Money and Banking*; Sherwood's *History and Theory of Money*; H. D. Macleod's *Bimetallism*; J. F. Johnson's *Money and Currency* (1920). See **CURRENCY**.

**Bindweed**. See **Convolvulus**.

**Binet, Alfred** (1857-1911), French psychologist, was born in Nice. He is best known for his attempts to discover some standard for the measurement of degrees of intelligence, the outcome of which were the Binet-Simon tests (1905 and 1908). He also published *On Double Consciousness* (1896); *L'ame et le corps* (1905). He edited *L'annee psychologique*, to which he contributed many articles.

**Binet Tests**. See **Intelligence**.

**Bingen**, (anc. *Bingium* or *Vincum*), town, grand-duchy of Hesse, Germany. It is the seat of the Rhenish Technical College, a Technical and Industrial School, and a Commercial School; p. 16,727.

**Bingham, Hiram** (1831-1908), American missionary, was born in Honolulu. He translated the Bible and other religious works into Gilbertese.

**Bingham, Hiram** (1875-1956), Am. explorer and politician, born Honolulu, T.H., ed. at Yale, Am. explorer 1906-15; gov. of Conn. 1924-25; U.S. senator 1925-33; chrmn. Loyalty Review Bd. 1951-53.

**Bingham, John Armor** (1815-1900), American jurist, was born in Mercer, Pa. He was in charge of the prosecution of Lincoln's assassins; and as chairman of the impeachment committee made the closing argument against President Johnson before the Senate. He was U. S. minister to Japan (1873-1885).

**Bingham, Joseph** (1668-1723), English divine, was born in Yorkshire, and is best known as author of *Antiquities of the Christian Church*.

**Bingham, Theodore Alfred** (1858-1934), American soldier, was born in Andover, Conn. He was promoted brigadier-general and retired in 1904. In 1917 he was recalled to active service in the U. S. Army and acted as chief engineer on the staff of the commanding general, Department of the East.

**Binghamton**, city, New York, county seat Broome co., on the Susquehanna River. Binghamton is situated in a rich agricultural region, and is noted for its dairy products; p. 80,674.

**Binnacle**, a stand or case for holding a ship's compass. The modern binnacle is of brass or bronze and is fitted with various devices whereby the magnetic needle is protected against the effects of shock and vibration, as also against the permanent and induced magnetism of the vessel in which it is placed. See also COMPASS.

**Binney, Horace** (1780-1875), American lawyer, was born in Philadelphia, Pa., and prepared the six volumes of reports of the Pennsylvania Supreme Court decisions known by his name (1807-14).

**Binnas, Charles Fergus** (1857-1934), Ceramic expert, born in England; head of royal porcelain works. In America after 1897 he taught ceramics; became president of American Ceramic Society.

**Binomial** (Lat. *bis*, 'twice'; *nomen*, 'a name'), an algebraic expression containing two terms. By the binomial theorem any

power or a binomial can be expanded into a series. The formula is—

$$(x+a)^n = x^n + nx^{n-1} + \frac{n \cdot n-1}{1 \cdot 2} a^2 x^{n-2} + \dots + \frac{n \cdot n-1 \cdot \dots \cdot n-r+1}{1 \cdot 2 \cdot 3 \cdot \dots \cdot r} a^r x^{n-r} + \frac{n \cdot n-1}{1 \cdot 2} a^{n-2} x^2 + na^{n-1} x + a^n.$$

$$\text{Ex. } (x+a)^5 = x^5 + 5ax^4 + 10a^2x^3 + 10a^3x^2 + 5a^4x + a^5.$$

**Binturong** (*Arctitis binturong*), a civet-like carnivore, a native of the E. Indies, arboreal and nocturnal in its habits, with a long, prehensile tail, tufted ears, and bristly fur.

**Binyon, Laurence** (1869-1943), English poet, was born in Lancaster; educated at Trinity College, Oxford. He was keeper of prints and drawings in the British Museum. He wrote *Odes* (1900); *The Sirens* (1927).

**Biogenesis**, a term used by Huxley in his *Lay Sermons* for what he defines as 'the hypothesis that living matter always arises by the agency of pre-existing living matter.' The term for the opposing doctrine is *abiogenesis*. See BIOLOGY.

**Biograph**. See CINEMATOGRAPH.

**Biography** is the art of presenting a life-work in full and significant delineation. Memorial tributes are an early feature in literature. Even the aged Nestor utilized the privilege of the panegyrist when he harangued his juniors on the tented field; and there is a similar attitude in Plato's delineation of Socrates. Xenophon, another Socratic disciple, writes *Memorabilia* of his master. This is the rudimentary memoir, and, somewhat later, the lament of Moschus over Bion set an elegiac example that has had momentous results. Several Latin writers have merits as biographers. But Plutarch, who lived in the reign of Domitian, is the first great biographer in the world's history. His *Parallel Lives* comprises forty-six biographies in pairs, a Greek and a Roman alternately, and several separate sketches, the whole constituting a work of sovereign value. It has been often translated, and North's English version of 1579 introduced Shakespeare to this gallery of noble characters.

Now and again in the middle ages there are notable products of biographical impulse. The Venerable Bede (673-735) wrote the *Life of St. Cuthbert*. The biographical work of the middle ages fitly culminates in Boccaccio's reminiscences of Dante. this happy connection, as



has been aptly said, supplying 'a great man to describe a greater.'

Formal biographers were somewhat late in appearing in English literature. In the 14th and the 15th centuries there were choice opportunities, but the literary bias was towards other ideals. There are still few biographies in the Elizabethan age. Cavendish's *Life of Cardinal Wolsey*, written about 1557, and first printed in 1641, is a striking little book which was undoubtedly used in the composition of Shakespeare's *Henry VIII*. The somewhat unsatisfactory *Life of Sir Phillip Sidney* by Lord Brooke, published in 1652, has supplied points that have been constantly used by subsequent biographers of the perfect, gentle knight. There is room for regret that Ben Jonson did not write a life of Shakespeare. How much it might have told, and what fatuous speculations it might have prevented! Jonson's memorial tributes are admirable, but a biography would have enhanced his literary reputation, and earned lasting gratitude. Mrs. Hutchinson (1620-64) produced, in her *Life of Colonel Hutchinson*, a work of uncommon merit, which was not published till 1806. But the foremost biographer of the age is Izaak Walton, whose *Lives of Donne, Wotton, Hooker, Herbert, and Sanderson* appeared, in the order named, between 1640 and 1678. Unaffected in style, and radiant with the author's genial personality, these biographies have an enduring charm.

Literary accomplishment marks the biography of the 18th century. Steele's tribute to Addison (*The Theatre*, 1720) makes a good beginning. Roger North (1653-1734) wrote lives of himself and his brothers, and the engaging *Lives of the Norths* appeared in 1742-44. Literature grace and charm were given to biography by the illuminating pen of Goldsmith. His *Voltaire* (1759) utilizes his personal knowledge and displays his narrative and descriptive resources. In 1762, after a sojourn in Bath, he produced his inimitable mock-heroic *Life of Beau Nash*, conferring immortality on a marionette of supreme quality. In the *Life of Dr. Johnson*, published in 1791, James Boswell took the foremost place among British biographers. His artlessness is the secret of his success. His genial affability recalls the method of Walton. 'An inspired idiot' he may have been, but he was a superb artist in biographical narration.

The development of the biographer's art made great advance in the 19th century. Southey was an ideal biographer, whose mastery of his art did not always imply exact and detailed knowledge of the subject under discus-

sion. His *Life of Nelson* (1813) is one of the most readable books in the language. With Lockport we reach one of the literary heights and resting places of the century. His *Burns* (1828) has strength, tone, and style; and after all that has been written on the poet, it maintains its authoritative value; and his *Life of Scott* (1837-9) competes with Boswell's great work for the first position among English biographies.

With Carlyle the survey makes a fresh start. A unique figure in literary history, he touched nothing on which he did not leave strong marks of his personality. His lectures on *Heroes and Hero-worship* have much interest for the student of biography. Carlyle's *Sterling* shows that the biographer discovers and reveals essential greatness, being himself a prophet or seer. *Schiller* in its first form appeared in 1825, *Oliver Cromwell's Letters and Speeches* in 1845, *John Sterling* in 1851, and *Frederick the Great* in 1858-65.

Meanwhile other biographers were at work and making contributions to their subject that in some respects fell hardly short of even Carlyle's achievement. Mrs. Gaskell's *Charlotte Brontë* (1857) has distinguished grace and charm—the author, herself an eminent novelist, being able to work with ready sympathy on her deeply suggestive subject. In his *Life of Goethe* (1859) George Henry Lewes produced a singularly bright and substantial work, giving in it one of the best studies of a foreign author made by an Englishman. Sir George Trevelyan's *Macaulay* appeared in 1876, and at once became a classic. Froude's *Carlyle* (1882-84), has the countervailing recommendations of comprehensiveness and charming style. His *Julius Caesar* (1886) is a thoroughly sound little book. Mrs. Oliphant proved her biographical competency in the *Edward Irving* of 1862 and later studies. In 1897 she produced the first two volumes of *William Blackwood and Sons: Annals of a Publishing House*.

The first quarter of the twentieth century witnessed a tremendous increase in biographical writings, as well as a marked change in the manner of treatment. Lytton Strachey's *Eminent Victorians* (1918) is one of the earlier examples of the modern type of biography which is not content with a mere recital of incident, but which seeks to set forth the personality of the subject.

Popular modern biographies have been written by Strachey in England, Maurois in France, Ludwig in Germany, and Gamaliel Bradford in the United States. The following English biographies are generally considered

to rank among the best: Huxley's *Life and Letters of Thomas Henry Huxley* (1900); Lee's *Queen Victoria* (1902); Monypenny's *Life of Benjamin Disraeli* (6 vols. 1910-20); Benson's *Ruskin* (1911); Sinclair's *The Three Brontës* (1912); Robertson's *Otto Bismarck* (1918); Strachey's *Queen Victoria* (1921); Charnwood's *Theodore Roosevelt* (1923); Strachey's *Elizabeth and Essex* (1928).

Of biographies by American writers there may be mentioned: Marshall's *George Washington* (1804-07); Irving's *Life and Voyages of Christopher Columbus* (1828); P. M. Irving's *Washington Irving* (1909); R. W. Griswold's *Poe* (1850); Nicolay and Hay's *Abraham Lincoln: A History* (1890); A. V. G. Allen's *Phillips Brooks* (1900); Beveridge's *Life of John Marshall* (1916); Hendricks' *Life and Letters of Walter Hines Page* (1922-5); Wm. Allen White's *Woodrow Wilson* (1924); Esther Forbes' *Paul Revere* (1942); George Santayana's *Persons and Places* (1944-45).

Some representative Italian biographies are Vasari's *Painters, Sculptors, and Architects* (1550); Muratori's *Rerum Italicarum Scriptores* (1723-51); *Life of Boccaccio*, by Baldelli and by Tiraboschi; *Life of Benvenuto Cellini*, translated by John Symington (1917); Papini's *Life of Christ* (1922). In French, the *Vie de Saint Louis of Joinville* (1309) has distinct literary importance, as have also Brantôme's outspoken and vivid *Memoirs* (1659). The *Memoirs of Saint Simon* (1675-1755) are a rich mine of history and biography. Later French biographers are Voltaire, Guizot, and Sainte-Beuve. Noteworthy also are Keim and Lumet's *Louis Pasteur* (1914); Maurois' *Ariel: the Life of Shelley* (1925). German biographers include Forster, Klein, Fischer. Brandes' *Goethe* (1923) is notable for historical scholarship.

Cyclopædic biographical works, both general and particular, have been frequently compiled. These include: *Acta Sanctorum of the Bollandists* (1643-1704); Chalmer's *Biographical Dictionary* (1812-17); Rose's *New General Biographical Dictionary* (1829-47); *Das geistige Deutschland: Deutsches Künstler-Lexikon der Gegenwart* (1898); Appleton's *Cyclopaedia of American Biography* (1888); American Historical Society's *Encyclopedia of American Biography* (1916-23); *Allgemeine Deutsche Biographie* and many others. Individual writers have produced groups of biographies of which the following are examples:—Allan Cunningham's *British Painters, Sculptors, and Architects* (1829-33);

Agnes Strickland's *Queens of England* (1840-8), *Queens of Scotland* (1850-9); Mrs. Jameson's *Early Italian Painters* (1845); Baker's *Biographical Dictionary of Music and Musicians* (new ed. 1911-20); Sir William Fraser's *Scotts of Buccleuch* (1879), and other similar works on noble houses; Kelly and Burrage's *American Medical Biographies* (1920).

Many valuable monographs have been contributed to various series, which have multiplied in great profusion. Among these are: 'English Men of Letters,' an admirable biographical library, edited by John Morley; 'The World's Epoch-makers'; 'American Men of Letters'; 'American Statesmen.'

In America, *The Dictionary of American Biography*, a voluminous library of biography started in 1928, was completed in 1936. A novel biographical history of the world, presenting a continuous and connected account of history in a series of brief biographies entitled *The Story of The Human Race*, by Henry Thomas, was published in 1933. Another important series of biographical sketches is Cottler and Jaffe's *Heroes of Civilization* (1936). See also AUTOBIOGRAPHY.

**Biological Research, Marine.** See MARINE BIOLOGICAL RESEARCH.

**Biological Survey, U. S.,** a bureau of the Department of Agriculture, established in 1885 as the Division of Economic Ornithology and Mammalogy, and after various changes of name, given its present title in 1905. The bureau studies the distribution and habits of native wild life, makes biological surveys of areas, and maps the natural life zones of the country.

**Biology,** the science of living things, in distinction from physics and chemistry, which deal with lifeless things. Since living things are dependent for their existence upon lifeless materials, and since matter is constantly passing from one state to the other, it is perhaps more accurate to define biology as the science which deals with the 'matter in living state'. The longer we study living things, the more clearly do we see that animals and plants are alike in many fundamental characteristics which distinguish them sharply from non-living objects. It is these general features which all living objects have in common that form the subject matter of the science of biology. The basis of life is protoplasm, a substance found in all living creatures, plant or animal. Certain forms of life, such as the bacteria of the soil and green plants, are able to take up the lifeless materials of the earth's

crust and convert them into protoplasm, but the great majority of organisms can utilize as food only the bodies or formed products of other organisms. Thus all animals feed upon other animals or upon plants. Plants alone can produce the food for all other organisms from lifeless material.

The first noteworthy characteristic of living creatures is their ability to grow at the expense either of lifeless materials or of the formed products of other living creatures. The growth of an organism continues without interruption, so long as a suitable food supply is available, until a certain size or stage is attained, when reproduction occurs. In this process, the body divides into two or more individuals, instead of one, or it gives off smaller portions of itself, in the form of spores, buds, eggs, or other special reproductive bodies, capable of developing under suitable conditions into a form like that of the parent individual. The simplest animals and plants have one-celled bodies, all the larger and more highly organized animals and plants have multicellular bodies, with cells of many different kinds performing widely different functions, united in one co-operative organization. Thus in the human body, muscle cells, bone cells, blood cells, stomach cells, kidney cells, and others all perform their diverse functions under the general control of the brain and spinal cord composed of nerve cells. All these diverse cells have grown from the original fertilized egg cell. See CELL.

Reproductive processes are of the most varied kinds. In general, they may be distinguished as asexual and sexual. In asexual reproduction, the parent individual gives rise to new individuals by division of its own body.

Sexual reproduction consists essentially in the fusion of two reproductive cells, individuals or potential individuals, to form a single new individual. Among the one-celled animals and plants, where asexual reproduction is the common and habitual mode of multiplication, sexual reproduction may be resorted to in time of stress, when the food supply becomes insufficient, or the temperature or moisture conditions unfavorable. It is a common device for organisms, when conditions are unfavorable for growth, to pass into a state of inactivity, becoming encysted or forming spores with thick resistant walls and dense protoplasmic contents containing little moisture. The seeds of flowering plants represent such a dormant stage. Sexual union occurs even in the highest animals and plants, only between reproductive bodies in the one-celled stage.

Cells capable of sexual union are known as gametes. The fusion of two gametes to form a new individual is known as fertilization, and the new cell or individual which it produces is called a zygote. Gametes which unite in fertilization must, in general, be alike; that is, they must be of the same kind of living substance, belonging to the same species. Some species will cross with each other, producing remarkably vigorous but completely sterile offspring. This is the case with the mule, product of a mare mated with an ass. The mule is a sterile animal. The dissimilarity of gametes capable of union in fertilization makes for variability among later generations of the offspring, and this has undoubtedly been an important factor in the development of animals and plants. See HEREDITY.

The differentiation of individuals as male or female is a phenomenon distinct from the development of sexual reproduction. The origin of new individuals by fusion of gametes, for sexual reproduction, may exist where individuals, differentiated as male or female do not occur. Sexual individuals, males and females, are recognizable when an individual is restricted to the production of one kind of gamete, pollen or egg cell, but not both. Thus ash trees and poplar trees regularly produce only one type of gamete, and are distinguishable either as male trees (pollen producers) or female trees (producers of egg cells and seeds). In all the higher animals (crustacea, insects, and vertebrates) male and female sexes are differentiated, but in most of the (lower) animal groups hermaphroditism (production of both male and female gametes in the same individual) occurs very commonly, just as it does in flowering plants. It has long been a source of speculation how this sexually separate condition is perpetuated, how sex is determined, why the sex character of one parent, rather than of the other, is expressed in the offspring.

The discovery of Mendel's law of heredity threw some light on this question, since in Mendelian inheritance a character of one parent may dominate or suppress an alternative character of the other parent. More recently studies of the genes by Morgan and others have produced information regarding the inheritance of traits in the fruit fly and other forms. The genes are particles in the chromosomes of the cell. Because of the similarities between different forms of life, their common cellular organization, the similarity of their processes of metabolism, growth and reproduction, it seems reasonable to suppose that all forms of life have been derived by

descent from one primitive form. But there is no certain proof of this. It may be that the earliest forms of life to originate were similar even when those origins were separated in time and space. Historically we have conclusive evidence in fossils that certain forms of life have descended from a common ancestor, as for example all vertebrates or all flowering plants. But there are so many gaps in the geological record that we can not state it as a certainty that vertebrates and flowering plants have descended along divergent lines from one and the same original form of life, much as the two have in common in their fundamental life processes. Notwithstanding all uncertainties, the theory that all organisms are derived by descent with modification from a single or a few primary forms of life renders intelligible the present multiplicity of organic forms and their interrelations, as does no other theory yet suggested.

In connection with the preceding general outline of Biology the reader is referred to the following articles in this work:

Adaptation	Hybrid
Cell	Mendel's Law
Colors of Animals	Metabolism
Egg	Mimicry
Embryology	Phylogeny
Environment	Protoplasm
Evolution	Reproduction
Fertilization	Sex
Heredity	Variation

See also the biographies of such biologists as Buffon, Cohn, Darwin, Huxley, and Lamarck.

**Bibliography.**—Fenton, C. L., *Our Living World* (1943); Jaeger, E. C., *Source-book of Biological Names and Terms* (2nd ed. 1950); Andrews, R. C., *Nature's Ways* (1951); Moon, T. J., and others, *Modern Biology* (rev. ed. 1951); Woodruff, L. L., and Baitsell, G. A., *The Foundations of Biology* (7th ed. 1951); Cousteau, J. Y., *The Silent World* (1953).

Biological research has succeeded in bringing to light many new facts about plant and animal life in recent years. In 1935 the hormone which controls the growth of plants was produced in a laboratory by synthetic methods. Pantothenic acid, an organic material essential for the growth and respiration of living cells, was finally isolated in the same year. Other important biological discoveries in 1935 were: the fact that air above 20,000 feet was found to be free of germs; a method was discovered to cause growth in the eggs of sea urchins from which the material

nuclei had been removed by centrifuging these eggs and treating them with a solution of sea water in concentrated form. It was found that vegetable seeds treated with hydrogen peroxide before planting are not affected by the spores of fungi which cause disease in plants. Copper phosphate was also successfully used in reducing the effectiveness of the diseases causing fungi. Owing to the work of an English experimenter, it may be possible to save people whose lungs do not function properly (victims of drownings, strangulation, pneumonia), by injecting oxygen directly into the blood stream. For his researches into protoplasm, Dr. Hans Spemann won the Nobel prize. He discovered the material in protoplasm which organizes it for the purpose of building tissues and organs.

In 1936 the newly discovered heavy hydrogen was used in tracing the course of material absorbed by plants and animals throughout their bodies. Biologists also found that chlorophyll, a substance necessary for plant life, absorbs the greatest amount of light at a wavelength of about 6700 angstroms. Therefore a reddish-orange light, which this wavelength represents, is most beneficial for plant growth. Experimental work with plants proves that keeping of plants under red light does cause them to grow much more rapidly. In Russia it was found that the crossing of wheat with a common weed has resulted in the production of a grain suitable for making bread. Russian scientists also found that they could use the blood of dead persons for purposes of transfusion quite as successfully as the blood of living people, provided the blood had been drained from the corpses within eight hours of death. The importance of this lies in the fact that it will now be possible to have blood supplies on hand for emergencies at a fraction of the former expense, as blood can be kept indefinitely by refrigeration.

**Biometry**, a term applied to that branch of science which deals with vital phenomena from the quantitative or statistical point of view. It involves methods of exact measurement, on the one hand, and precise and refined mathematical analyses on the other. The study of Vital Statistics is that special branch of biometry which concerns itself with the data and laws of human mortality, morbidity, natality, and demography. As a definitely recognized branch of biological science biometry owes its origin primarily to the work of Sir Francis Galton and Professor Karl Pearson. See BIOLOGY.

**Bion**, a poet of the Alexandrian period of Greek literature. His best known work is the *Epitaph of Adonis*.

**Bionomics** ('laws of life'), a term suggested by Professor E. Ray Lankester to designate the study of the external life of plants and animals, their interrelations with other individuals, and their adaptations to their organic and inorganic environment. The importance of considering the organism, not as an isolated existence, but as a link in the great chain of living creatures, was first realized by Darwin, and his volume on *Earikworms* (1881) may be taken as a typical example of a bionomical investigation. See BIOLOGY.

**Biot, Jean Baptiste**, (1774-1862), French physicist, was born in Paris. He published valuable treatises on Curves (1802), on Physical Astronomy (1805), on Physics (1816-17), and on Egyptian Astronomy (1823).

**Biotite, or Black Mica**, a mineral belonging to the mica group, but distinguished from other micas by its black color and by the presence of considerable proportions of magnesia and iron.

**Biplane**. See Aeronautics.

**Biquadratic** (Lat. *biquadratus* = twice squared), an equation involving the fourth power of the unknown quantity, of the form  $x^4 + px^3 + qx^2 + rx + s = 0$  where  $p, q, r$ , and  $s$  are constants. A biquadratic can sometimes be reduced to a quadratic, as, for instance, where it happens to be a perfect square, or can be reduced to the form  $x^2(x + a)^2 + bx(x + a) + c = 0$ . In other cases it may be solved by means of an auxiliary cubic, by Descartes', Ferrari's, or Euler's method, unless the roots are all real or all imaginary, when the cubic equation has generally real and unequal roots.

**Birch**, a tree belonging to the genus *Betula*, of the family Betulaceae. The birches, of which there are some thirty-five species, are distributed throughout the Northern Hemisphere. The tree has a smooth bark, usually curling back in thin horizontal layers; ovate, serrate leaves; monoecious flowers borne in catkins, and cone-like fruit. Perhaps the most famous American birch is the Paper or Canoe Birch (*B. papyrifera*), a tall tree (70 ft.), with a laminated bark, the outer layers being chalky white, the inner of a pink tinge. The outer layers of bark peel off in thin, curling strips as the trunk grows. The American Indians stretched this supple, waterproof bark over light wooden frames, and sewed it with split spruce roots, to make their canoes.

Other common species are the Black or Red Birch (*B. nigra*), valuable for furniture, the Cherry Birch or Sweet Birch (*B. lenta*), a handsome tree whose wood is stained to imitate cherry or mahogany and from the bark of which is extracted wintergreen oil, and the Common birch (*B. alba*).



Photo from A. T. De La Mare Co.  
American White Birch (*Betula Populifolia*).

**Birch-Pfeiffer, Charlotte** (1800-68), German actress and dramatic writer. Her plays are still popular in Germany, especially *Die Gunstlinge*, *Hinko*, *Die Waise von Lowood* and *Pfefferrosel*.

**Bird, Arthur** (1856-1923), American composer. His compositions include his *Carnival*, for the orchestra, *Symphony in A Major*, ten compositions for the organ, and pieces for the piano, songs, etc.

**Bird, Edward** (1722-1819), English subject painter, court painter to Queen Charlotte. See A. Cunningham's *Lives of the Most Eminent British Painters* (1879-80).

**Bird, Frederic Mayer** (1838-1908), American clergyman, a leading authority on hymnology, and was co-editor of several collections of hymns. Author of *The Story of Our Christianity* (1893).

**Bird, Isabella.** See Bishop.

**Bird, Robert Montgomery** (1805-54), American author, was born at New Castle, Del. He wrote three successful tragedies—*The Gladiator*, *Oraloosa*, and *The Broker of Bogota*.

**Bird, William.** See Byrd.

**Bird-catching Spider**, the name given to the species of the genus *Mygale*, which are very large, hairy spiders found in tropical countries, especially in the Amazon Valley. They appear to live chiefly on insects, but the fact that they can kill small birds would appear to be well authenticated. The body may reach a length of 2 in., and the span is stated to be sometimes as much as 7 in.



*Bird-Catching Spider*

**Bird Cherry** (*Prunus padus*) is a species of the order Rosaceae, and in the same genus as cherry and plum. *Prunus pennsylvanica* is another species.

**Bird-lice**, or **Mallophaga**, a family of Neuropterous insects. An active form (*Atenopon palladium*) commonly infests domestic poultry, though other species also occur on these birds.

**Birdlime**, a viscid material obtained from the bark of holly and similar trees by boiling.

**Bird of Paradise**, a general name given to the members of the family Paradisaeidae, which includes beautiful birds, inhabiting the Malay Archipelago, and extending into the Australian region. Although the birds of paradise are allied to the plainly dressed crows, they excel all other birds in their magnificent development of accessory plumes and their glory of color. As usual among birds, these statements are true only of the males, the females being relatively plain. For descriptions of the birds in their native haunts, reference should be made to A. R. Wallace's *Malay*

*Archipelago* (10th ed. 1890). See also article BOWER-BIRD. Also name of tropical plant.

**Birds** constitute one of the best-defined groups in the animal kingdom, being distinguished at once from all other animals by the characteristic covering of feathers. The presence, in addition to feathers, of an epidermic covering of scales over parts of the body is an external character which suggests a descent from reptiles—a suggestion borne out alike by details of internal structure and by geological evidence. Indeed, in spite of the fact that some birds do not fly, we may say, speaking broadly, that birds are distinguished from reptiles by those peculiarities of structure and function which bear, directly or indirectly, upon the power of flight.

The organs of flight in a bird are the fore limbs, which have been converted into wings. The result of this is that the posterior limbs only can be used in supporting the body on the ground: the bird—to use an old term—is a biped. Now, these changes of function of fore limb to wing, and hind limb to sole support, have produced striking and, in a sense, independent modifications of structure.

Considering first the fore limb, we find that the conversion into a wing has resulted in the reduction of the hand to three fingers, of which one only (the index) is well developed. It is this first or index finger which bears the large primary feathers of flight, and it is always of considerable length. In living birds the tail is always short, and usually ends in a bony plate, the ploughshare bone, which carries a bunch of tail feathers, of much importance in flight.

The feathers give the necessary resistance to wings and tail during flight and keep the body warm. Its temperature is unusually high, this being, again, no doubt associated with the quickened respiration necessitated by flight. This respiratory efficiency depends on the development of air-sacs connected with the lungs, and with it is associated a four-chambered heart, and a circulation as perfect as that of a mammal. As in swift-moving animals in general, the head is relatively small, though the brain is better developed than that of a reptile. In living birds teeth are absent, and the jaws are covered with a horny beak. Birds lay eggs as do reptiles, but they are fewer in number. Their high intelligence enables the parents to protect their eggs and young by many ingenious devices, and the young are also, in almost all cases, devotedly cherished until the dangers of early life are

past. The vast migrations performed by many birds are ascribed ultimately to the desire to seek safe nesting-places in which the young may be reared.

The classification of birds is a matter of great difficulty, for many characteristics hitherto relied upon prove, on inquiry, to be merely adaptations to a similar method of life.

cluding all other known birds, fossil or living, in all of which the tail is short and the palm-bones fused. The arrangement of birds illustrated is that adopted by Knowlton and Ridgeway. Consult Mathews, F. S., *Field Book of Wild Birds and Their Music* (rev. ed. 1921); Peterson, R. T., *Field Guide to Western Birds* (1941); Hausman, L. A.,



*Wading and Swimming Birds.*

1. Stormy petrel. 2. Mandarin duck (male). 3. Scarlet ibis (Tropics). 4. Great northern diver. 5. Flamingo. 6. Red-breasted goose (Asiatic). 7. King penguin (Antarctic).

Most authorities agree that birds should first of all be divided into two great sets—the Archaeornithes ('primitive birds'), including only the strange fossil known as Archaeopteryx; and the Neornithes ('modern birds'), in-

*Field Book of Eastern Birds* (1946); Peterson, R. T., *Field Guide to the Birds* (2nd ed. 1947) and *How to Know the Birds* (1949); Terres, J. K., *Songbirds in Your Garden* (1953).

## ORDER

1—Hesperornithiformes	Hesperornis
2—Ichthyornithiformes	Ichthyornis
3—Struthionithiformes	True Ostriches
4—Rheiformes	South American Rheas
5—Casuariiformes	Cassowaries and Emus
6—Crypturiformes	Tinamous (South America)
7—Dinornithiformes	Moas (extinct)
8—Epyornithiformes	Giant birds (extinct)
9—Apterygiformes	Kiwi (New Zealand)
10—Sphenisciformes	Penguins
11—Colymbiformes	Loons and Grebes
12—Procellariiformes	Petrels, Albatrosses
13—Ciconiiformes	Cormorants, Pelicans, Herons, Storks, Flamingos
14—Anseriformes	Swans, Ducks, Geese
15—Falconiformes	Vultures, Hawks, Eagles
16—Galliformes	Fowls, Hoatzin
17—Gruiformes	Cranes, Rails, Bustards
18—Charadriiformes	Plovers, Shore Birds, Pigeons, Sand Grouse
19—Cuculiformes	Cuckoos, Parrots
20—Coraciiformes	Rollers, Owls, Swifts, Woodpeckers, Humming-birds
21—Passeriformes	Larks, Thrushes, Swallows, Wrens, Crows, Finches, Warblers

**Birdsboro**, borough, Pennsylvania, in Berks County, on the Schuylkill River. It has blast furnaces, rolling mills, foundries and machine works; p. 3,158.

**Bird's Eyes**, in timber, nodules in planed wood now thought to be caused by the blow of a woodpecker hard enough to bruise and arrest the activity of the cambium for a short time without loosening the bark.

**Bird's-foot** (*Ornithopus*), a genus of plants belonging to the order Leguminosae. The common bird's-foot is a small plant of little importance, although eagerly eaten by sheep. *O. sativus* is the Serradilla, a forage crop of Europe.

**Bird's-foot Trefoil** (*Lotus corniculatus*), a genus of plants and shrubs belonging to the order Leguminosae. There are some eighty species widely distributed and grown for their yellow, purple and rose colored flowers. The plant is sown in permanent pasture for forage.

**Bird's Nests, Edible.** See **Edible Bird's Nests**.

**Birds of Prey**, a group of birds classed according to their predatory habits rather than according to similarity of structure. The more modern classification divides them into three orders, the owls (*Striges*), the ospreys (*Pandiones*), and the Accipitrines, which include the *Falconidae*, the *Vulturidae*, the *Carthartidae* and the *Serpentariidae*. The members of this group are generally characterized by strong curved beaks and talons, keen eyesight, and swift and powerful flight. Some members

live by killing their own prey, while others subsist on carrion. See also such articles as **BUZZARD**; **EAGLE**; **FALCON**; **HAWK**; **OWL**; **VULTURE**.

**Birejik**, ancient **Birtha**, in Turkey.

**Biretta**, or **Baretta**, a term originally used for a pontifical cap, but now for the square cap worn by Roman Catholic and certain Anglican clerics.

**Birge, Edward Asahel** (1851- ), American naturalist. Author and Pres. of U. of Wisconsin, 1918-25.

**Birkbeck, George** (1776-1841), English reformer, the founder of mechanics' institutions.

**Birkbeck Institute**, an institution founded by George Birkbeck (q.v.) as the London Mechanics Institute (1824), is now known as Birkbeck College.

**Birkdale**, parish, England, in Lancashire. It has a well equipped hydropathic institution.

**Birkenfeld**, province of Germany. Its surface is hilly and well wooded, and is drained by the Nahe. The polishing of gems (agates) is a leading industry; p. 55,649.

**Birkenhead**, seaport and market town, England, in Cheshire, on the left bank of the Mersey, opposite Liverpool. The docks have an extensive area. Woodside Lairage is one of the largest and best equipped abattoirs in the kingdom. The first tunnel under the Mersey, between Birkenhead and Liverpool, was opened in 1886. Shipbuilding forms the chief industry. Coal is largely exported and there



are engineering works, breweries, and iron-smelting works; p. 145,592.

**Birkenhead, Frederick Edwin Smith,** 1st Lord (1872-1930), Lord Chancellor of Great Britain, 1919-22, was born in Birkenhead. He was prominent in the Ulster movement against Irish Home Rule (1914). He

commercial capital of the Midlands, and the second manufacturing city of England. Though mentioned in Domesday, and sacked by Prince Rupert during the civil war (1643), the city is essentially modern. Many of the streets, notably New Street, are wide and stately, and the public buildings are metro-



*Typical Land Birds.*

1. Falcon. 2. Dove. 3. King bird of paradise. 4. Golden pheasant. 5. Hoopoe (Europe). 6. Great bustard (Asia). 7. Rufous tinamou (S. America). 8. Parrot (*Aprosmictus*, E. Australia).

was an authority on international law and the author of several books on that subject.

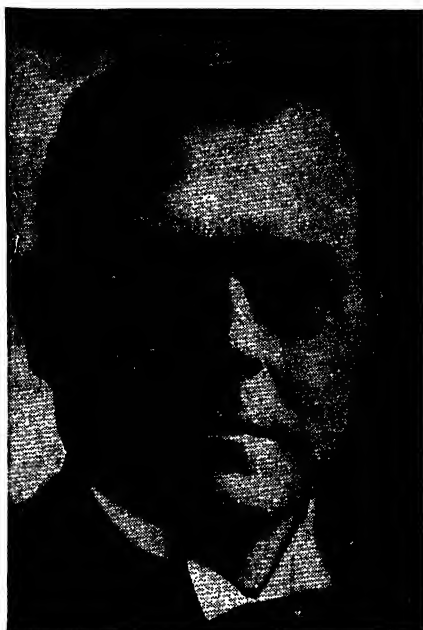
**Birmingham**, municipal borough and city (lord mayor since 1893), and county borough Warwickshire, England. Birmingham is the

politan in character and notable as examples of architecture of various periods.

The proximity of Birmingham to the South Staffordshire coal field makes the city the hardware metropolis of the kingdom. It

was the center of the Chartist movement (see **CHARTISM**). Birmingham suffered from German air-bombing in 1941; p. 1,112,340.

**Birmingham**, city, Alabama, county seat of Jefferson co., is situated near the center of the State. It is a well built, imposing city, with handsome residences, well-paved streets, fine public buildings, and good schools. Birmingham is situated in the heart of a rich coal and iron district. There are immense iron and steel works, blast furnaces, rolling mills, machine shops, and boiler works.



Augustine Birrell.

It was settled in 1871 and named after the English Birmingham. Since 1900 its growth has been uniformly rapid; p. 326,037.

**Birnam**, village, Perthshire, Scotland. South of the village rises Birnam Hill, once covered by a royal forest (see *Macbeth*).

**Birney**. **David Bell** (1825-64), American soldier, son of James G. Birney. He took a conspicuous part in the battles of Fredericksburg, Chancellorsville, and Gettysburg.

**Birney**, **James Gillespie** (1792-1857), leader of the constitutional Abolitionists. He was a member of the Kentucky legislature. Though a slaveholder, he gradually became more and more impressed with the evils of slavery, and in 1834 he freed his own slaves.

He removed to Cincinnati, Ohio, and there on Jan. 1, 1836, issued the first number of *The Philanthropist*. In 1840 he founded the Liberty Party, of which he was twice (1840 and 1844) the candidate for the presidency. (See **ABOLITIONISTS** and **LIBERTY PARTY**.) Among his publications are *Political Obligations of Abolitionists* (1839) and *Speeches in England* (1840). Consult William Birney's *Life and Times of James G. Birney*.

**Birney**, **William** (1810-1907), American soldier and lawyer, son of James G. Birney. He served with distinguished gallantry in the Union forces during the Civil War.

**Biron**, family of distinguished French generals. **ARMAND DE GONTAUT, BARON DE BIRON** (1524-92), fought against the Huguenots. His son, **CHARLES** (1561-1602), became governor of Burgundy. **ARMAND LOUIS** (1753-94), Duc de Lauzun, accompanied Lafayette to America (1778).

**Biron**, **Ernst Johann** (1690-1772), Duke of Courland, was the favorite of the Empress Anna Ivanovna, niece of Peter the Great, and became practically ruler of all the Russias.

**Birrell**, **Augustine** (1850-1933), English barrister and author, was born near Liverpool. He held many government positions and served in Parliament. His works include *Obiter Dicta* (two series, 1884, 1887); *Life of Charlotte Brontë* (1885); *William Hazlitt* (1902) and *Frederick Locker-Lampson* (1920).

**Birth, Concealment of**, is a criminal offence in the law of all civilized countries. See **INFANTICIDE**.

**Birth Control** is the popular term for the limitation of offspring by voluntary and artificial prevention of conception. When Malthus's *Essay on Population* appeared in England in 1798, an interest in the question of overpopulation was aroused. In 1876 Charles Bradlaugh and Annie Besant backed the publication in England of a pamphlet, *Fruits of Philosophy*, by Dr. Charles Knowlton of Boston, Mass., recommending birth control. They were arrested and sentenced, but the penalties were never exacted. From that time, the birth control movement spread rapidly.

In 1916, when America's first birth control clinic was founded in Brooklyn by Margaret Sanger, it was closed as a nuisance. But by 1943 field work was being carried on in 17 states, health departments of 6 states were advocating planned parenthood, and birth control centres numbered 794.

In 1939 the British organization became the

Family Planning Association, and in 1942 the Birth Control Federation of America, Inc., changed its name to Planned Parenthood Federation of America. See also EUGENICS, POPULATION, VITAL STATISTICS.

For further information, consult the following books: James Ambrose Banks' *Prosperity and Parenthood* (1954); Lawrence Lader's *The Margaret Sanger Story and the Fight for Birth Control* (1955); and Marston Bates' *Prevalence of People* (1955).

**Birthmark**, see **Angioma**.

**Birth Rate**, see **Vital Statistics**.

**Birthright**, the right of succession to property based on the order of birth of the several claimants. See **PRIMOGENITURE**; **HER**.

**Bisanthe**. See **Kodosto**.

**Bisayas**. See **Visayas**.

**Bisbee**, town, Cochise co., Arizona, 8 m. from the Mexican boundary. Gold, silver, lead, zinc, and notably copper are mined hereabouts; p. 3,801.

**Biscay**, Bay of (ancient *Cantabricum Mare* and *Aquitanus Sinus*; French, *Golfe de Gascogne*), that portion of the Atlantic Ocean which sweeps in along the northern shores of the Spanish Peninsula, and thence curves northward along the western shores of France.

**Biscuit**, in the United States, is the name (sometimes) given to small, round, soft cakes made from dough, raised with yeast or soda, and sometimes shortened with lard. What are known as biscuits in England are usually called crackers in the United States.

**Biscuit**, in pottery, is the name given to porcelain and other pottery after the first firing. See **POTTERY**.

**Bisharin**, or **Beja**, a people inhabiting the lower part of the Blue Nile.

**Bishnapur**, the ancient capital of Bankura district, Bengal, India; p. 20,000.

**Bishop**, the highest order of the clergy in Christian churches. The word comes from the Anglo-Saxon *biscop*, an abbreviated form of the Greek *episcopos*, 'overseer.' While Roman Catholics admit that in the New Testament the same persons are sometimes indifferently called 'bishops' or 'presbyters,' they hold that it was because these individuals discharged both functions. But it is their belief that Christ designed both orders, making the bishops the direct successors of the apostles, and placing the ordination of priests in their hands alone. (See **SUCCESSION**, **APOSTOLIC**.) The High Church Anglicans consider episcopacy as necessary not only to the well-being, but to the being of a church.

The bishop of the *Roman Catholic Church* belongs to the highest order of the hierarchy. He must be a man of thirty years of age, and of approved learning and virtue. The theory of the *Church of England* is much the same as that of the Roman Catholic Church, except that in England the authority of the crown has replaced that of the pope. Bishops in the *Protestant Episcopal Church* perform the same duties as the Anglican bishops. In the *Methodist Episcopal Church*, which is somewhat presbyterial in its government, the bishops have no dioceses, but exercise joint jurisdiction over the entire church.

Bishops are found in all denominations in the United States holding the episcopal form of government, though the power of the bishop varies greatly in different churches. See **EPISCOPACY**; **ORDERS**, **HOLY**; **ARCHBISHOP**; **CHURCH**, **ANGLICAN**; **PROTESTANT EPISCOPAL CHURCH**; **ROMAN CATHOLIC CHURCH**. Consult *Hatch Organization of the Early Christian Churches*; *Lindsay Christian Ministry in the First Three Centuries*.

**Bishop**, Sir Henry Rowley (1786-1855), English composer of eighty-eight operatic entertainments but best known for his settings of songs, including *Should He Upbraid*, *The Bloom Is On the Rye*.

**Bishop-Auckland**, market town, Durham, England; p. 14,290.

**Bishopweed**, or *Goutweed*, also goatweed, or herb gerard (*Agopodium podagraria*), an umbelliferous weed common in hedges and grass plots, eaten by cattle, and formerly boiled and eaten as greens.

**Biakra**, or **Biskara** (the Roman *Ad Piscinum*), town, Algeria, a popular resort, depicted in Hichens' *Garden of Allah*; p. 36,422.

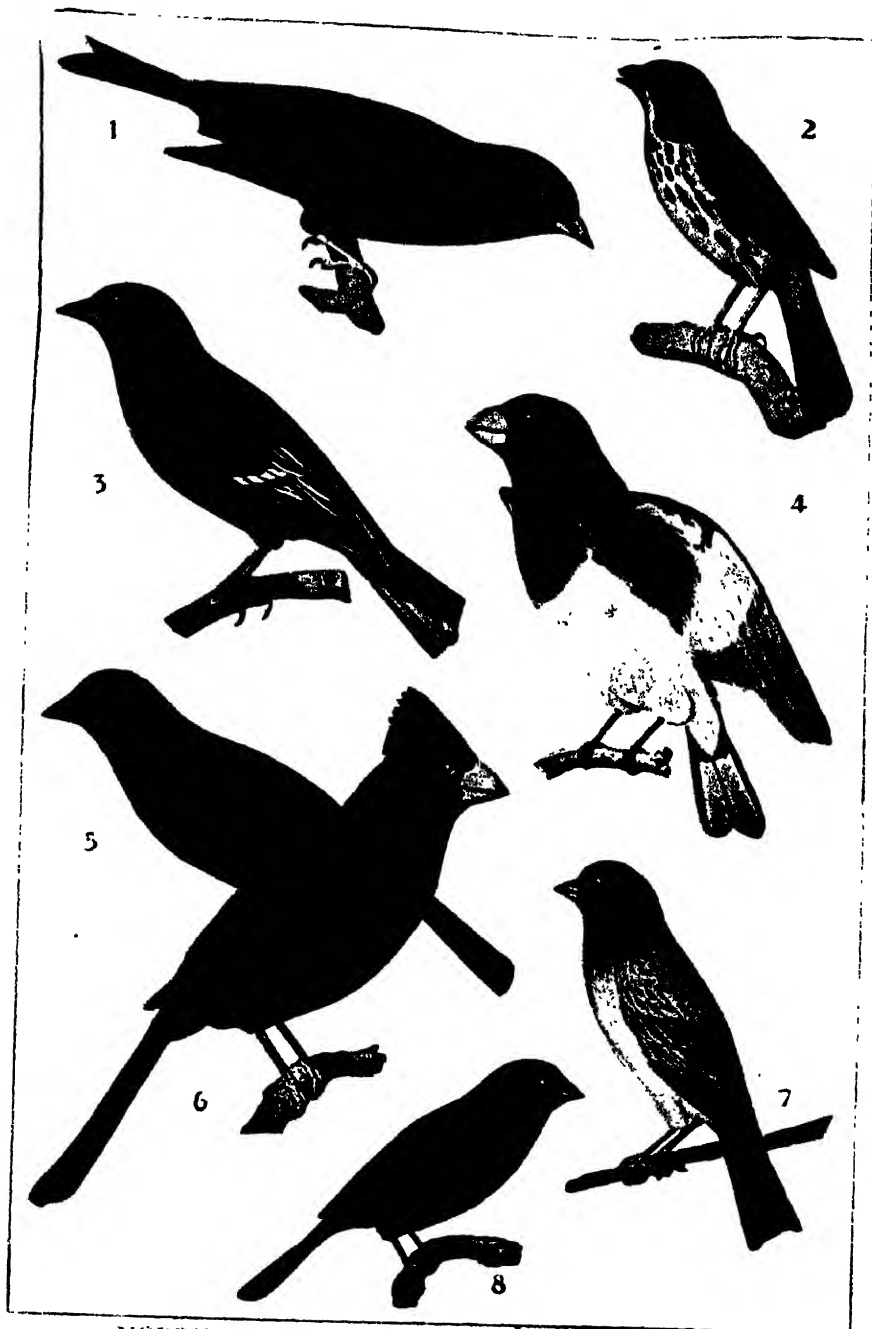
**Bisley**, village, England.

**Bismarck**, city, North Dakota, capital of the State; p. 18,640.

**Bismarck Archipelago**, a general name for the Pacific islands lying immediately east of New Guinea. Physically, as well as in their plant and animal life, these islands have a close affinity with New Guinea, but except for the coasts they are relatively little known. In World War I it was occupied by an Australian force and at the conclusion of the war it was assigned to Australia under a mandate; p. about 176,000. Area 19,200 sq. m.

**Bismarckburg**, district, now known as **Kasanga**, in former German East Africa.

**Bismarck-Schönhausen**, **Herbert Nikolaus**, Prince (1849-1904), eldest son of Prince Otto von Bismarck, was engaged in various diplomatic missions.



# NORTH AMERICAN SEED-EATING SONG-BIRDS

1. Scarlet Tanager, or Black-winged Redbird. 2. Song Sparrow. 3. Baltimore Oriole.  
 4. Rose-breasted Grosbeak. 5. Cowbird. 6. Cardinal Grosbeak. 7. Purple Finch.  
 8. Indigo Finch.

All on cloth cards.



**Bismarck-Schönhausen, Otto Edouard Leopold, Prince von** (1815-98), commonly spoken of as **PRINCE BISMARCK**, became Minister-President and Minister for Foreign Affairs of Prussia in 1862. Bismarck, whose anti-democratic spirit had declared itself from the first, now rode roughshod over the opposition of the deputies and the press, dominating his enemies with unconstitutional severity. After the war of spoliation against Denmark, Bismarck carried out his long-cherished policy for the humiliation of Austria. In 1867 Bismarck organized the North German Confederation, and for his services was made Chancellor of the Confederation and President of the Federal Council. The Luxemburg difficulty between France and Prussia was adjusted by the neutralization of that territory.

In July, 1870, France declared war against Russia (see **FRANCO-GERMAN WAR**), and on the capitulation of Paris, Bismarck dictated the terms of peace. In January, 1871, the king of Prussia was crowned as German emperor at Versailles. Bismarck was appointed chancellor of the German empire, and raised to the rank of prince. He now occupied himself with domestic reform, and with the promotion of the drastic Falk laws against the Roman Catholics—a measure which resulted in the temporary expulsion of the Jesuits and the imprisonment of several bishops. In June 1878 Bismarck presided over the Berlin Congress.

After the accession of William II. in 1888, difficulties arose between the new sovereign and his minister. The latter's serious illness in 1893 brought about a pseudo-reconciliation which continued, on the surface at least, until his death, July 31, 1898.

In private life Bismarck was a man of warm affections. Though imperious in character, and sometimes unscrupulous and vindictive, he was quiet and cultured in manner. As the chief creator of modern Germany he will always hold a conspicuous place in history.

**Bismarck Sea, Battle of**, March 2-6, 1943, American land-based airpower under Gen. MacArthur scored a great victory over Japanese attempting to invade New Guinea.

**Bismuth**, (Bi, 209.0), a metallic element that occurs in many places free, as well as in combination, as sulphide, oxide, and carbonate. Bismuth unites readily with other metals, forming fusible alloys, which are useful on account of their low melting points, and for expanding on solidification, thus enabling them to be employed, among other uses, in taking sharp casts of objects that would be

damaged by a high temperature. (See **FUSIBLE METAL**.)

Bismuth forms several compounds of service in the arts and in medicine. Bismuth is found native in England, France, Peru, and Siberia, but is obtained chiefly from Saxony. A considerable quantity is produced in the United States as a by-product of the refining of metals.

**Bison**, a genus of wild cattle closely allied to the ox, and represented by two rapidly disappearing species—the American *Bos americanus* or *Bison americanus*, and the European aurochs, or zubr, *Bos bison*, *Bos europæus*, or *Bison bonasus*.



*American Bison.*

The food of the bison consists of grass and brushwood, and the leaves and bark of young trees. Its cry is peculiar, 'resembling a groan or a grunt, more than the lowing of an ox.' It does not attain its full stature until after its sixth year, and lives for about thirty or forty years. The American bison, slightly smaller than the European bison, is popularly called *Buffalo*, but must be distinguished from the true buffalo. The bison was formerly abundant in America. Now it is nearly extinct. In recent years, however, encouraging efforts at preservation have been made by the United States and Canadian governments and American bison societies.

The bison used to congregate in large herds, and when migrating travelled in solid columns of thousands and tens of thousands, which were scarcely able to turn or arrest their progress for the pressure of the masses from behind on those in front. The economic importance of the bison was considerable. The flesh, like coarse-grained beef, was tender and juicy, while the tongue, marrow bones, and hump were especially prized. The hump formed pemmican; the fat, tallow; the skins, clothing or tent and canoe covers; the hair, cloth; and the dried droppings, fuel. Consult Garretson, M. S., *American Bison; the Story of Its Extirpation As a Wild Species and*

*Its Restoration Under Federal Protection* (1938); Sandoz, M., *Buffalo Hunters* (1954).

**Bissagos Islands**, a group of 30 low, sandy and wooded islands of volcanic origin off the west coast of Africa, belonging to Portugal, situated opposite the estuary of the Geba. The area is about 1,550 sq. m. Chief town Bolama.

**Bissau**, the chief port of Portuguese Guinea, on the coast of Senegambia, West Africa. It is in the Bissagos Islands.

**Bisschop, Christoffel** (1828-1904), the painter of Friesland who, with Israels, revolutionized Dutch painting. He painted sunlit interiors and enclosed spaces luminously warm — *The Morning Sun, Winter in Friesland*, etc.

**Bissell, Edwin Cone** (1832-94), American theologian, was born in Schoharie, N. Y., and graduated at Amherst. He was pastor of various Congregational churches, and author of *Historic Origin of the Bible* (1873), *The Pentateuch, its Origin and Structure* (1885), and other works.

**Bissell, George Edwin** (1839-1920), American sculptor, born at New Preston, Conn. He executed several statues and groups for the St. Louis Exposition.

**Bissell, Wilson Shannon** (1847-1904), American lawyer, was born at New London, Oneida co., N. Y., and graduated (1869) at Yale; studied law at Buffalo, and in 1872 formed a law partnership with Lyman K. Bass, to which Grover Cleveland was admitted the following year. He was appointed post-master-general of the United States by Cleveland in 1893.

**Bissen, Hermann Wilhelm** (1798-1868), Danish sculptor who studied at Rome (1823) under Thorwaldsen, by whose will he was appointed to complete his master's unfinished works and to take charge of his museum. See *Life* by Plon (1871).

**Bithur**, town in the North-Western Provinces, India (United Provinces of Agra and Oudh), on the Ganges, is much frequented by pilgrims, and is devoted to the worship of Brahma; p. about 7,500.

**Bithynia**, district, Asia Minor, bounded on the e. by Paphlagonia, s. by Phrygia, w. by Mysia, and n. by the Black Sea. Its inhabitants were immigrants from Thrace.

**Bitlia**, province, Armenian S.S.R., on the southern slope of the Taurus hills; p. 90,000.

**Bitlis**, town, Armenian S.S.R., 120 miles n.e. of Diarbekir; lies in a ravine, surrounded by hills above 2,000 ft. high. It was the seat of the Kurdish chieftains until their subjugation in 1847; p. 30,000.

**Bittern** (*Botaurus*), a genus of birds allied to the herons. The bittern is a nocturnal bird, which, like its allies inhabits swampy ground, and is remarkable for the booming cry uttered at the breeding season. In bitterns the prevailing tint is brown, with black streaks or markings. They nest on the ground in marshes, and lay several plain olive-green eggs.

**Bitter Root**, range of mountains on the boundary line between Idaho and Montana, a part of the Rocky Mountain system, having an altitude ranging between 9,000 and 10,000 feet.



*Bittern.*

**Bitters**, a large and important group of drugs, including gentian, calumba, quassia, and others. Certain alkaloids have the general properties of bitters, in addition to their distinctive and more important characteristics. Their action begins in the mouth, where, by medicinal doses, the nerves of taste are stimulated, producing a flow of saliva, and thus assisting the first stage of digestion and increasing appetite. On reaching the stomach the bitter principle acts directly on the gastric nerves, stimulating secretion and causing the sense of hunger. The bitter principle of hops is one of the most important ingredients in beer.

**Bittersweet**, or **Woody Nightshade** (*Solanum dulcamara*), a climbing plant common in the north temperate zone. The shrubby or climbing bittersweet, of North America, is *Celastrus scandens*, a woody vine, having conspicuous red and orange fruits in fall.

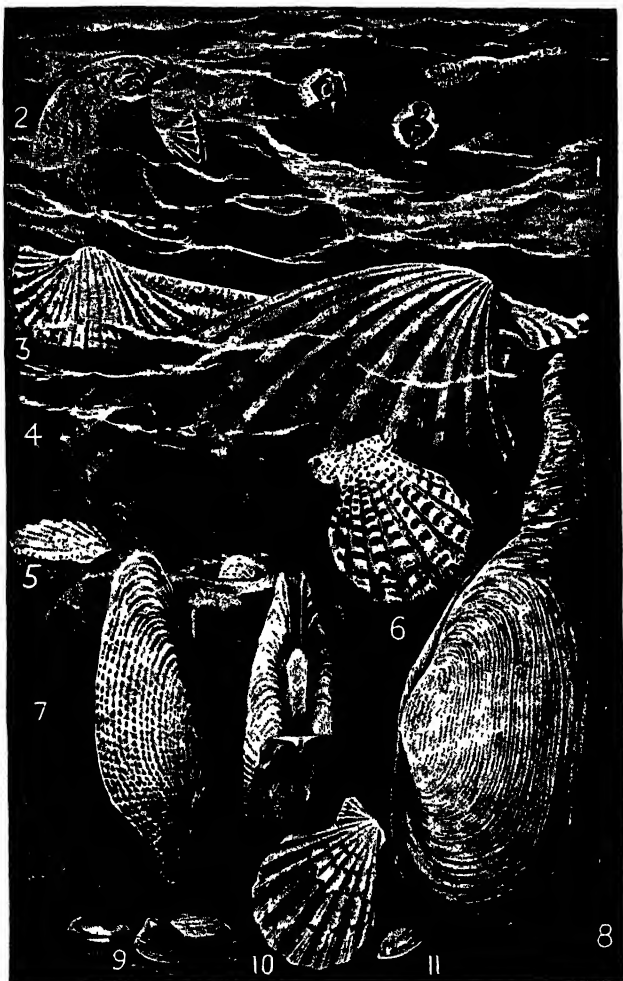
**Bitterwood**. See **Quassia**.

**Bitumen**, in its popular meaning, includes all those mineral products, of organic origin, which are characterized by a high percentage of carbon and hydrogen, by a powerful and peculiar smell, and by the facility with which

they burn, giving off a heavy, sooty smoke. Among these are asphalt, naphtha, petroleum, pitch, elaterite, ozokerite, gilsonite, the so-called mineral resins, and the oils procured from marl and shale. See ASPHALTUM, PETROLEUM, etc.

JEREMIAS GOTTHELF, wrote a long series of tales illustrating Swiss peasant life.

**Bivalves**, or *Lamellibranches*, are molluscs or shell-fish in which the shell consists of two valves placed at the right and left sides of the animal. The body is bilaterally sym-



*Bivalves.*

1. Shipworm (*Teredo navalis*), in floating wood. 2, 3. Ark-shells (*Arca*). 4, 5, 6, 10. Scallops (*Pecten*). 7. A stone-borer (*Pholas*) in rock. 8. Soft-clam (*Mya arenaria*) in mud. 9 and 11. *Nucula radiata*.

**Bituriges**, a powerful tribe in Aquitanian Gaul. They were conquered by Caesar. **Bitunus**, Albert (1797-1854), was a Swiss Protestant minister who, under the name of

metrical, and compressed from side to side and there is no distinct head region as in gastropods. Bivalves occur both in salt and in fresh water, but none are adapted for a



terrestrial life. In the oyster, mussel, scallop, cockle, clam, we have forms of considerable commercial importance; while the pearl oyster (*Meleagrina*) is valued on account of the size, brilliancy, and color of the concretions or pearls formed around minute irritants introduced between the mantle and the shell. In tropical regions the bivalves may reach a great size, as witness the giant clam (*Tridacna*), whose valves may measure two feet across. Though the majority are sedentary or slow-moving, the Limas and scallops are capable of swimming by means of rapid jerks.

**Biwa Lake** (Jap. *Biwa-ko*, 'a guitar'), in province of Omi, Japan, 10 m. n.e. of Kioto by river and canal; is drained by the Yodogawa R., which flows into Osaka Bay. It measures 36 m. in length by 12 m. in width, and is justly celebrated for its beauty, especially at the s. end. According to the Japanese legend, the lake was produced by an earthquake in 286 B.C., which also upheaved the volcano of Fujiyama.

**Bixa Orellana**, a plant common in tropical America, and much cultivated in the West Indies; belongs to the order Bixaceae, of the violet group of orders.

**Bixby, William Herbert** (1849-1928), American military engineer. He removed the wreck of the *Maine* from Havana Harbor in 1912.

**Bizet, Alexandre César Léopold**, called **Georges** (1838-75), French musical composer. Bizet's great masterpiece, *Carmen*, performed at the Opera Comique in 1875, and shortly afterward in Vienna, Brussels, Berlin, and London (1878), though at first a failure, has since become his most famous work. See *Lives* in French, by Pigot (1886) and Bellaigne (1891).

**Björneborg**, seaport, Finland; p. 13,417.

**Björnson, Björnstjerne** (1832-1910), Norwegian poet, dramatist, and novelist. His earliest and best works were his peasant stories, *Arne* (1858), *Synnove Solbakken* (1857), *En Glad Gut* (1860), whose vigor and originality at once established his reputation. In Italy he composed the drama *Kong Sverre* (1861) and the famous trilogy *Sigurd Slembe* (1862), two of the noblest productions of Norwegian literature. Of his later works the best are the dramas *Maria Stuart* (1864) and *Sigurd Jorsalfar* (1872), the tales *Fiskerjenten* (1868) and *Brude-Slaatten* (1872), and the poetical romance *Arnljot Gelline* (1870). But in the little tales *Mors Hænder* and *Een Dag* (published in *Nye Fortællinger*, (1894) he once again shows

his original power; Nobel prize 1903. **Bjornsson, Sveinn** (1882-1952), first president of republic of Iceland.

**Björnstjerna, Magnus** (1779-1847), Swedish statesman, author of *The British in East India* (1839), *Hindu Theogony* (1843).

**Black, Hugh** (1868-1953), Scottish theologian, was born in Rothesay; educated at Glasgow University; he was a Presbyterian minister until 1906, when he became a professor in Union Theological Seminary, N. Y. He wrote *Friendship* (1898); *Three Dreams* (1912); *The Adventure of Being Man* (1929).

**Black, Hugo Lafayette** (1886- ), American politician and lawyer; elected U.S. Senator from Alabama by aid of Ku Klux Klan. Appointed to U.S. Supreme Court, 1937, by Pres. Franklin D. Roosevelt.

**Black, James** (1823-93), American prohibitionist. He first proposed the establishment of a prohibition party. He wrote *A History of the Prohibition Party* (1880).

**Black, Jeremiah Sullivan** (1810-83), American jurist, became secretary of state in 1860, and endeavored to neutralize the efforts of the secessionists until the succession of President Lincoln, when he retired. See *Essays and Speeches of Jeremiah Black* (1885).

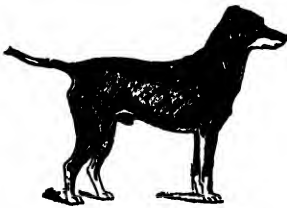
**Black, John** (1783-1855), Scottish journalist, made several good translations from German, French, and Italian works, and wrote, in 1810, a *Life of Tasso*.

**Black, Joseph** (1728-99), chemist, of Scottish extraction, was born at Bordeaux. He laid the foundation of quantitative analysis; was the first to propound the theory of 'specific heat,' but is better known as the discoverer of 'latent heat' in 1761. See Robison's Preface to Black's *Lectures on Chemistry* (1803).

**Black, William** (1841-98), novelist, was born in Glasgow, where he studied art. In 1864 he removed to London, where he joined the staff of the *Morning Star*. He was for some time literary editor of the *Examiner*, and editor of the *London Review*. He abandoned journalism entirely in 1874. His first novel, *Love or Marriage*, was published in 1866, and was followed by *In Silk Attire* (1869) and *Kilmeny* (1870). *A Daughter of Heth* (1871), perhaps the best of his many stories, established his reputation. Among the most important of his works are *The Strange Adventures of a Phaeton* (1872), *A Princess of Thule* (1873), *White Heather* (1885), *In Far Lochaber* (1888), *Brisels* (1896), and *Wild Eelin* (1898).

**Black Acts**, acts of the Scottish Parliament (1424-1594) printed in black letter.

**Black-and-Tan Terrier** is bred in two varieties—the ordinary, which weighs up to twenty pounds; and the toy, which must be under seven pounds. The color is black with rich tan markings.



*Black-and-Tan Terrier.*

**Black Art.** See **Magic**.

**Black-Ash.** See **Sodium and Alkali**.

**Black Assizes**, a pestilence which appeared at Oxford, July 6, 1577.

**Blackberry**, the fruit of various species of *Rubus*. The berries are black in color, and the drupelets or fruit-grains cling to their receptacles until they decay. All are shrubs, generally very prickly, and grow in various kinds of soil. The fruit ripens from July to September. The most important blackberries in cultivation are derived from *R. nigrobaccus* (formerly known as *R. villosus*), which is indigenous to North America. It is upright, and tall, with long-stalked, taper-pointed leaflets, and white flowers. The dewberries (*R. villosus*; *R. invisus*, *R. trivialis* and *R. vitifolius*) have only lately been cultivated, and with varying success.

**Blackbird**, a name given in various parts of the world often to very different birds, whose plumage is prevailingly black. The blackbirds of the United States and Canada are of the family Icteridae, related to the starlings, and consist of several species of large size, half as big as a crow, the males wholly black, and called 'crow blackbirds'; also of a smaller species, the cow-bird (*Molothrus ater*), other species of which are numerous in South America; also the red-winged blackbird, notable for gathering in autumn in great flocks on prairies and marshes. All are migratory, nest in bushes and trees, lay greenish eggs heavily marked with spots and lines, and have their females and young brown. The cow-birds are further exceptional in laying pepper-dotted eggs, one at a time, in the nests of other birds, like the European cuckoo. The

Mexican or Savanna blackbird is the ani (q.v.), a relation of the cuckoos. The East Indian blackbirds are grackles. The British blackbird is a favorite European song-bird, and one of the thrushes closely allied to the North American robin.

**Blackbirds**, **Field of**, or **Kosovo Polje**, a small plain in Turkey in Europe, was the scene of two great battles—in 1389, when Sultan Murad I. defeated the Servians; in 1448, when John Hunyady of Hungary was defeated by Sultan Murad II.

**Blackbuck**, the common antelope of India (*Antelope cervicapra*), so called from the shining brownish-black of the coat of the male, the females and young being light brown. See **ANTELOPE**.

**Black Bulb Thermometer** (also called in *vacuo* or radiation thermometer) is a sensitive maximum registering thermometer, having the bulb and a portion of the stem covered with lampblack.

**Blackburn**, municipality, Lancashire, England, famous for Blackburn 'checks,' now the center of the Lancashire cotton spinning and weaving industries, with 140 mills and over 55,000 looms. Here, in 1764, Hargreaves invented his 'spinning jenny'; p. 126,630.

**Blackburn, Joseph Clay Styles** (1838-1918), American lawyer and legislator, born in Woodford co., Ky., and educated at Center College. He was a member of the House of Representatives in 1875-85. He served in the U. S. Senate in 1885-97. He was appointed a member of the Isthmian (Panama) Canal Commission in 1907.

**Blackcap** (*Sylvia atricapilla*), a small British song-bird the male of which has a black head. The blackcap is closely allied to the thrushes, and is a migrant.

**Blackcock**, also **Heathcock**, the black grouse (*Tetrao tetrix*), the female being called grayhen.

**Black Country.** See **Staffordshire**.

**Black Death.** See **Plague**.

**Black Earth**, a fertile soil of the nature of loess; its dark color being due to organic matter. It is noteworthy for yielding abundant crops.

**Blackfeet**, or **Siksika**, a large division of the Algonquin linguistic stock formerly ranging from the Missouri river north to the Saskatchewan along the slopes of the Rocky Mountains. At one time they were very powerful and owned great herds of horses, but the smallpox broke out among them about 1840 with deadly effect. At present they reside upon reservations in Montana and Alberta.

See Grinnell's *Blackfoot Lodge Tales* (1903); Coues's *New Light on the Early History of the Greater Northwest* (1897).

**Blackfish.** The name of various fishes and fish-like animals prevailing black in color. Thus several of the killer-whales of the genus *Globiocephalus* are so called by both British and American fishermen, especially the ca'ing whale or bottlehead of the northeastern Atlantic. Sailors also called various grampuses by this name. Among true fishes, this name is given locally in the east to the tautog, to a sea-bass and some others; and in Alaska to a small fresh-water fish (*Dallia pectoralis*), which ascends the rivers in vast numbers to spawn, and is caught and preserved by the natives, to whom it is very valuable as a food resource.

**Black-fly,** a blackish gnat of the family Simuliidae which swarms in the forests of Canada and the n.e. United States in the hotter parts of summer.

**Black Forest** (Ger. *Schwarzwald*), a mountainous wooded region in s.w. Germany. It is a region of lovely valleys winding among

the Black Forest is the home of many quaint legends.

**Black Hand,** a symbol used by members of a wide-spread Italian society, and affixed to blackmailing letters containing threats of personal injury and even death on failure of compliance.



*High Bush Blackberry.*



*Bjørnstjerne Bjørnson, the Norwegian Novelist.*

wooded heights (highest altitude 4,900 ft., in the Feldberg), and is inhabited by an industrious race of wood cutters and lumbermen, and makers of wooden clocks, barrel organs, musical boxes, and straw hats. The Black Forest is one of the favorite summer resorts of the Germans, and is also of great strategic importance as a barrier to the direct passage of troops east or west between South Germany and Alsace and France. In German literature,

**Black Hawk War,** a minor Indian war in the United States (1832), the Indians (Sacs and Foxes) being led by Black Hawk (1767-1838). In the war, 1,340 United States regulars and 5,368 United States volunteers were engaged, and about 65 men were killed or wounded.

**Blackheath,** an elevated common in Kent, England. The Danes encamped on it in 1012, and here Wat Tyler (1381) and Jack Cade (1450) assembled their followers. In the end of the 18th century the common was much frequented by highwaymen.

**Black Hills,** group of mountains mainly in the western part of South Dakota. The highest summit, Harney Peak, has an altitude of 7,216 ft.; average elevation, 2,500 to 3,000 ft. The region is one of the richest gold-producing districts in the United States, and contains also numerous other metals. The group obtains its name from the black pine forests, with which it is extensively covered.

**Black Hole.** See Calcutta.

**Blackhorse,** one of the edible suckers (*Cylophus elongatus*) of the rivers of the Mississippi valley.

**Blackie, John Stuart** (1809-95), Scottish author and professor, was called (1834) to the

Scottish bar, but soon devoted himself to literature. From 1841-52 he held the chair of humanity in Marischal College, Aberdeen, and from 1852-82 that of Greek in Edinburgh University. He was an ardent student of many subjects—political, scholastic, philological, and moral. His chief works were a metrical translation of *Æschylus* (1850); *Songs and Legends of Ancient Greece* (1857); *Homer and the Iliad*, in 4 vols. (1866); *Self-Culture—Intellectual, Physical and Moral* (1877); *The Language and Literature of the Highlands of Scotland* (1875); *The Wisdom of Goethe* (1883); *Life of Robert Burns, Scottish Song* (1889); *Christianity and the Ideal of Humanity* (1893). See *Life* by Anna M. Stoddart (2 vols. 1895).

**Blacking.** The use of blacking and other polishes for leather dates back to the times of the ancients, but the compound now known as such was introduced into Great Britain from Paris in the reign of Charles II. The manufacture is now of considerable extent, as various polishes are required for the different leathers used for harnesses, shoes, etc.

**Black Isle,** peninsula separating Cromarty Firth from Beaulay and Moray Firths, Ross-shire, Scotland.

**Black Lead, Plumbago,** or preferably **Graphite**, an allotropic form of carbon, found in micaschist, gneiss, granite, meteoric iron, argillite, etc., in beds, sheets, detached masses, and crystals, in Siberia, Ceylon (chief source of black lead in commerce and the arts), New Brunswick and other parts of Canada, New Zealand, and Germany. It is a lubricant in machinery, but is most used in the manufacture of pencils and crucibles. It is also used as an inner covering of electrolyte moulds, and for conductors of electricity.

**Black Letter,** a name invented in the 17th century for the types imitated from the handwriting in use in England in the 15th century, as contrasted with those founded on the Roman or Italian hand revived by the Italian scholars of the Renaissance. All Caxtons' books are printed in black letter.

**Black List.** In Great Britain, printed lists abstracted from public records, of English, Scottish, and Irish bankruptcies, etc., and other information affecting the financial standing of firms and individuals, circulated in private for guidance in mercantile transactions. In the United States institutions known as commercial agencies are established in all commercial centers for furnishing similar information. The term is used for a wide variety of trade, social, and police lists. In this country the term is more commonly applied to lists of

discharged employees kept by employers of skilled labor and furnished by them to other employers in the same line of business, or to lists kept by labor unions of non-union workmen, or of persons employing the latter, or of the persons denominated 'scabs' and 'strike-breakers' with the view of enforcing some species of boycott or terrorism against the black-listed persons. This form of black-listing has in some states been made a criminal offence by statute.

**Blackmail.** In early English law, rents payable in cattle or produce, as distinguished from rents payable in white money or silver, called white mail. At a later period the same term was, probably at first as a joke, applied to the compulsory tribute of cattle levied by marauders. By further extension of meaning the expression has come to denote the criminal offence of extorting money or property by threats of exposure for some real or imagined wrong-doing, or of injury to person or property.

**Black Market,** an illicit market for undertaking prohibited transactions of any kind.

**Blackmore, Sir Richard** (d. 1729), English court physician and author, was born in Wiltshire. He was a voluminous writer of poetry and prose, of medical treatises and controversial divinity. See Johnson's *Lives of the Poets*.

**Blackmore, Richard Doddridge** (1825-1900), English novelist. *Clara Vaughan*, his first novel, appeared in 1864, succeeded in 1865 by *Cradock Nowell*. *Lorna Doone*, a romance of Exmoor, the author's most popular work, appeared in 1869. Blackmore's novels are distinguished for their fidelity in the delineation of nature, people and customs of the w. and s. of England.

**Black Mountain College,** institution of higher learning in North Carolina; founded 1933. Called Progressive Education's most famous outpost; students help to run it.

**Black Mountains,** a short range of mountains in N. C., a part of the Appalachian system. Mount Mitchell (or Black Dome), with an altitude of 6,684 ft., is the highest peak in the U. S. e. of the Mississippi River.

**Black Prince, Edward,** the (1330-76), eldest son of Edward III. of England; created Duke of Cornwall (1337) and Prince of Wales (1343); commanded the van at Crecy (1346); said to be so called the Black Prince from the color of the armor he wore at this battle; defeated and took captive John, king of France, at Poitiers, and brought him to London; created Prince of Aquitaine and Gascony (1362).

**Black River,** or **Big Black River,** a tributary of the White River, which heads in south-

east Missouri and flows in a general s.e. direction to the boundary of Arkansas. It is about 400 m. long.

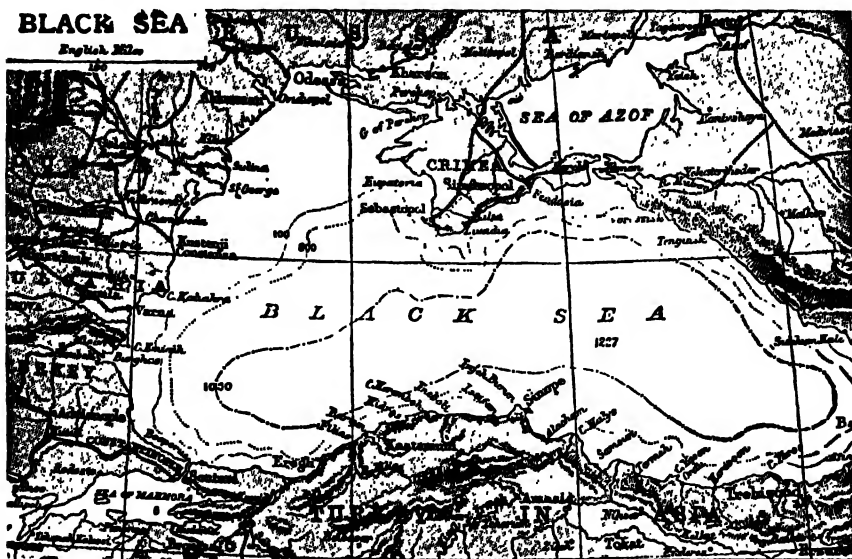
**Black River**, an east affluent of Lake Ontario. It connects, through the Black Canal, with the Erie Canal.

**Black Rod**. The gentleman usher of the Black Rod is usher of the Order of the Garter. His symbol of office is a black rod surmounted by a gold lion.

**Black Sea** (anc. *Pontus Euxinus*), an enclosed sea in the s.e. of Europe, having Russia on the n. and e., Asia Minor on the s., and Turkey, Bulgaria, and Roumania on the w. It measures some 700 m. from e. to w., and

est times, being the scene of the legends of Jason who sailed it to find the Golden Fleece. The Turks closed it to foreign traders in 1453, but in 1774 Russia obtained permission to trade there. By the Treaty of Paris (1856) it was opened to commerce of other nations but not to ships of war, a treaty abrogated by Alexander II of Russia in 1871. It was declared Russian territory in 1896. In first World War the Russian fleet was active there, especially against Turkey. The Lausanne Peace Treaty (1923) set up a Commission pledged to maintain freedom of navigation through the Dardanelles and the Bosphorus.

**Black Sea Government**, or **Chernomor-**



350 m. from n. to s., and its area is estimated at 139,300 sq. m. It is a steep-sided basin with a nearly flat bottom. The Black Sea is not only subject to annual fluctuations of level, ranging from 3 1-2 to 6 1-2 in. above the mean level of the year in May and June down to 2 1-2 to 4 in. below that level in October and in February, but it also seems to fluctuate over unequal periods, in close dependence upon the volumes of rainfall which come down over its drainage basins. The restriction of the circulation to the thin upper strata is, on the whole, inimical to marine life, and is conducive to the formation in the deep parts of the sea of vast quantities of sulphuretted hydrogen. The Black Sea is practically destitute of islands, and seldom freezes, even along the shores. The Black Sea has been navigated from earli-

est times, being the scene of the legends of Jason who sailed it to find the Golden Fleece. The Turks closed it to foreign traders in 1453, but in 1774 Russia obtained permission to trade there. By the Treaty of Paris (1856) it was opened to commerce of other nations but not to ships of war, a treaty abrogated by Alexander II of Russia in 1871. It was declared Russian territory in 1896. In first World War the Russian fleet was active there, especially against Turkey. The Lausanne Peace Treaty (1923) set up a Commission pledged to maintain freedom of navigation through the Dardanelles and the Bosphorus.

**Blacksnake**. The most common of the larger colubrine snakes of North America (*Zamenis constrictor*), when adult black in color throughout on the upper surface, becoming slaty along the abdomen and with a white chin; but in the Southern and Western states a greenish or bluish hue prevails instead of pure black, and hence the snake is locally known as blue or green racer. The young are dusky and blotched. It often reaches and occasionally exceeds six ft. in length; and is extremely swift and agile. These snakes are numerous in one or another variety throughout all the warmer parts of North America.

**Blackstone**, town, Worcester co., Mass., a textile center named for William Blackstone, first settler of Boston; p. 4,968.

**Blackstone, Sir William** (1723-80), writer on English law. The publication of his famous *Commentaries* on English law took place in the year 1765-70. They had an immediate and overwhelming success. Their great merit is the admirable way in which the author handles an immense mass of materials, and unloads it gently upon the reader, in such quantities as the average man can bear. They were for a century the basis of legal practice in the United States.

**Blacktail.** The common name in the West for two North American deer: (1) the mule deer; and (2) the Columbian blacktail. In both cases the name is due to the blackness of a part of the tail as contrasted with the conspicuous white tail of the Virginian deer. The mule deer is elsewhere described (see DEER; MULE DEER). The true blacktail is a smaller, long-eared deer of the Pacific coast from northern California to British Columbia. See Roosevelt (and others), *The Deer Family* (1902).

**Blackthorn, or Sloe** (Lat. *Prunus spinosa*). A European shrub, of the rose family.

**Black Tom Explosion.** On July 30, 1916, a terrific explosion of undetermined origin destroyed the huge Lehigh Valley munitions shipping terminals in Jersey City, N. J., killing four persons and injuring hundreds. The act was blamed on German agents, but the responsibility never was definitely fixed.

**Black Vomit.** See **Yellow Fever**.

**Blackwall**, district of London, containing the East India Docks and shipbuilding yards.

**Black Warrior**, an American merchant vessel, trading between New York City and Mobile, Ala., which, stopping at Havana, Cuba, in transit, was seized (Feb. 28, 1854) by the Spanish authorities in Cuba on the ground that she had violated the regulations of the port, in not manifesting her cargo.

**Black Warrior**, river in Alabama, rising in the northern part of the state. It is nearly 300 m. long and navigable to steam vessels to Tuscaloosa.

**Black Water.** See **Sheep**.

**Blackwater**, the name of fifteen rivers and streams in the United Kingdom, the most important of which are:—(1.) River in Munster, Ireland; rises on borders of Cork and Kerry, and after a course of 100 m. falls into Youghal harbor. (2.) River in Ulster, Ireland; after a course of about 50 m. falls into Lough Neagh

(3.) River in Essex, England; enters the North Sea after a course of about 40 m.

**Blackwater Fever** is a tropical disease of a malarial type, which has been described under many different names, generally suggested by prominent signs or symptoms—e.g. haemoglobinuria, haematuria, bilious haematuric fever, haemorrhagic malarial fever, yellow remittent fever, bilious remittent fever, and melanuric fever. It is an acute infectious fever, and is often fatal. It is prevalent all through tropical Africa, Madagascar, Sicily, Sardinia, the Greek Archipelago, India, and some parts of South America. It has been considered essentially a malaria, but in suitable districts it seems likely to attack any whose health is below par from any cause whatever without any previous malarial attack.

**Blackwell, Elizabeth** (1821-1910), Anglo-American physician, born at Bristol, England, was brought to the United States in 1832, and after her father's death taught school in Cincinnati and elsewhere, meanwhile pursuing medical studies under private instruction. After being refused admission to several medical schools on account of her sex, she was finally admitted to the medical school at Geneva, N. Y., where she took her degree of M.D. in 1849. She pursued her studies in Paris and London, and began practice (1851) in New York, where she organized (1854) the New York Infirmary for Women and Children, and was active in organizing the women's relief association for sending nurses and supplies to the front in the Civil War. Dr. Blackwell zealously promoted medical education for women. Author of *Pioneer Work in Opening the Medical Profession to Women* (1895).

**Blackwell, Thomas** (1701-57), British classical scholar, born in Aberdeen; wrote on Homer.

**Black Witch.** A bird. (See **ANI**.)

**Blackwood, John** (1818-79), Scottish publisher, was born at Edinburgh, became editor of *Blackwood's Magazine* (1845). He recognized the first Lord Lytton's genius, and discovered George Eliot, all of whose novels save one were published by him.

**Blackwood, William** (1776-1834), founder of the celebrated Edinburgh publishing house which issued the first number of *Blackwood's Magazine* in April, 1817. William Blackwood undertook the editorship, and gathered round him a staff of distinguished contributors, including Scott, Lockhart, Hogg, Wilson (Christopher North), De Quincey. See Mrs. Oli-

phant's *Annals of a Publishing House* (1897-8).

**Bladder.** The bladder is the reservoir for the urine. It is a musculo-membranous sac, situated in the pelvis, behind the pubes and in front of the rectum, in the male; in the female, the uterus and vagina lie between it and that intestine. In infancy it is conical in shape; in the adult, when empty, it is a small triangular sac lying deeply in the pelvis, flattened from before backwards. When slightly distended, it is rounded in shape; when greatly distended, ovoid, and rises from the pelvis into the abdominal cavity. When moderately full, it contains about a pint, but is capable of great distention, and has been known to hold twenty pints. It has three openings into it—those of the two ureters from the kidneys, and that of the urethra.

**Bladder Nut.** The *Staphyleas*, or bladder-nut trees, are hardy, deciduous shrubs. The best known is *S. colchica*, which blooms in June and July, its white flowers being borne in large terminal racemes. *S. Bolander*, of Southern California, blooms later in the year.

**Bladder-plum, or Pocket-plum,** is a malformation of the fruit of plum, caused by the attacks of a fungus.

**Bladder Seed** (*Phytospermum cornubiense*) is an umbelliferous plant with bladder-like fruits. It occurs in the south of France and Spain.

**Bladder Senna** (*Colutea arborescens*) is a leguminous shrub with yellow flowers.

**Bladder-worms,** the larval stages of tapeworms; so named from the bladder-shaped form of its embryo; sometimes more dangerous parasites than the adults, owing to the great destruction of tissue which they can produce in such organs as brain, liver, etc. In the case of one of the tapeworms of man, *Tenia solium*, the eggs of the parasite leave the body of the host with the excreta, and are eaten by the omnivorous pig. Within the alimentary canal of the pig the embryos hatch from the shelled eggs, and bore their way into the muscles, where they become encysted and form bladder-worms. A bladder-worm consists of a head or scolex, and a distended bag of fluid, the so-called bladder. If imperfectly-cooked pork containing these bladder-worms is swallowed by man, the bladder-worms lose the bladder, and the head or scolex attaches itself to the wall of the alimentary canal, and grows into a tapeworm. Man may become infected with bladder-worms owing to imperfect cleanliness, and especially to close companionship with dogs whose health is not carefully looked

after, for the dog is peculiarly liable to tapeworm.

**Bladderwort** (*Utricularia*), a genus of water plants which are rootless and grow suspended in the water. The flowers resemble those of snap-dragon, often yellow or purple. The common bladderwort (*U. vulgaris*), which is widely distributed, has a stem fringed with fine leaves which are repeatedly divided with linear segments. Some of the leaf divisions form intricate bladders, which have an aperture protected by bristles and fitted with a trapdoor. Larval crustaceans and other water animals take shelter inside the bladders, but the trapdoor prevents their return; they die, and the dissolved substances of their bodies provide the plant with food.



Bladderwort.—1, Bladder, enlarged.

**Bladensburg,** village, Maryland. Here, on Aug. 24, 1814, the British defeated the Americans, and as a result captured the town of Washington; p. 2,899.

**Blaeu, or Blaeuw, Jan,** Dutch cartographer, died 1673, author of *Magnum Theatrum Urbium Belgica* (1649), *Atlas Magnus* (1650-62), and *Theatrum Civitatum Italiae* (1663). The *Atlas Magnus* includes 49 maps of Scotland prepared by Timothy Pont. Blaeu's father, WILLEM JANSZON (1571-1638), pupil of Tycho Brahe, published a map of the heavens, and *Novus Atlas* (1634-62).

**Blagoveshchensk**, the only town in the Amur province, Asiatic Russia. It is the center of a gold-mining district; p. 58,761.

**Blaine, James Gillespie** (1830-93), an able American political leader, born at West Brownsville, Pa., Jan. 31, 1830. On both his father's and his mother's side he was of Scotch-Irish descent. He taught in the Western Military Institute, Georgetown, Ky. (1848-51), and in the Pennsylvania Institute for the Blind, at Philadelphia (1852-4) and in 1854 removed

of Chinese immigration. He supported Lincoln during the Civil War.

Blaine failed to secure the presidential nomination of his party in 1876 and in 1880, winning it in 1884 to be defeated by Grover Cleveland. From 1889 to 1892 he was secretary of state, and negotiated with Germany a treaty concerning Samoa, called and presided over the Pan-American Congress, which he had previously planned, engaged in a vigorous discussion with Lord Salisbury concerning the Bering Sea Fisheries, the questions at issue being finally submitted to arbitration, and tried in vain to carry out the reciprocity provisions of the McKinley Act. He published *Twenty Years of Congress, from Lincoln to Garfield* (2 vols., 1884-6). The best biography is D. S. Muzzey's *James G. Blaine* (1934).

**Blair**, city, Nebraska, county seat of Washington co.; p. 3,815.

**Blair, Andrew George** (1844-1907), Canadian lawyer, was born at Fredericton, N. B., called to the bar in 1866, premier 1883-96.

**Blair, Chas. F.**, first man to make solo trip in airplane across the North Pole, May 29, 1951.

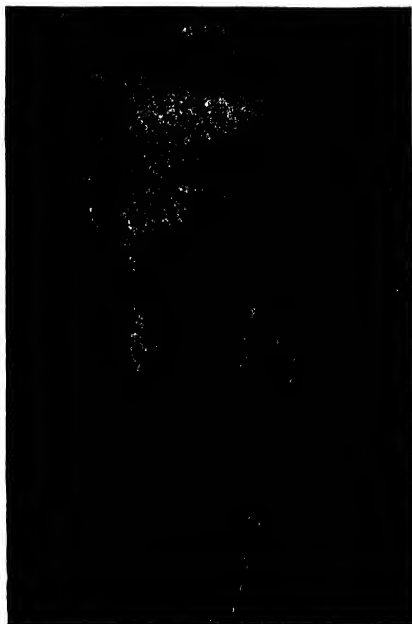
**Blair, Francis Preston** (1791-1876), Amer. journalist, born Abingdon, Va.; ed. of *Globe* 1830-45; active in support of Repub. party from its foundation to close of Civil War, but opposed party's reconstruction policy and joined forces with the Democrats.

**Blair, Francis Preston, 2d** (1821-75), Am. lawyer and soldier, son of the preceding, born Lexington, Ky., and grad. Princeton (1841). By his prompt action, in the early days of the Civil War, in preventing the seizure of St. Louis arsenal by state troops, it is thought that Mr. Blair preserved Missouri and Kentucky to the Union. U. S. senator from Missouri, 1871-3.

**Blair, Henry William**, American senator from New Hampshire, 1875-85. He was an advocate of national aid to state education, and was active in temperance and woman suffrage movements. He took much interest in pension matters, and drew up many of the bills granting pensions to soldiers.

**Blair, Hugh** (1718-1800), Scottish divine and author, born in Edinburgh, where he later gave lectures at the university.

**Blair, James** (1656-1743), American colonial preacher and educator, born in Scotland. He went to Virginia in 1685, becoming one of the most influential men in the colony. He is remembered, however, chiefly as the virtual founder, and as the president from 1693 until his death, of the College of William and Mary.



*James G. Blaine.*

to Augusta, Me., where he, with John L. Stevens, edited (1854-7) the *Kennebec Journal* (Whig), then probably the most influential newspaper in the state. From 1863 to 1877 he was a member of the National House of Representatives, of which he was speaker in 1869-75, and from 1876 to 1881 he was a member of the U. S. Senate. His services in Congress made him one of the most conspicuous national figures of the time. He was virtually the author of the Fourteenth Amendment to the Constitution; and he vigorously opposed the greenback movement of 1867-8. As Speaker of the House, he opposed the Electoral Commission as unconstitutional. In the Senate he opposed the Bland Silver Coinage Act, advocated ship subsidies, and urged the restriction



**Blair, John Insley** (1802-99), American capitalist, was born in Warren co., N. J. He had a large share in building the railroad properties which were consolidated as the Delaware, Lackawanna and Western railroad in 1852. He engaged extensively in railroad building in the West and Southwest, being one of the original directors of the Union Pacific railroad.

**Blair, Montgomery** (1813-83), American politician, was born in Franklin co., Ky., and graduated (1835) at West Point. He was counsel for the defendant in the Dred Scott case, was postmaster-general under Lincoln, 1861-4, and brought about numerous innovations in the postal service.

**Blair, Robert** (1699-1746), Scottish divine and poet, was born in Edinburgh.

**Blairsville**, borough, Indiana co., Pa. Its manufactures are glass, coke, flour, etc.; p. 5,000.

**Blake, Edward** (1833-1912), Canadian statesman, born in Middlesex co., Ontario. He was Liberal premier in 1871, minister of justice, 1875-7, and president of the Council, 1887-8.

**Blake, Francis** (1850-1913), American inventor, born at Needham, Mass. He invented the telephone transmitter known by his name in 1878.

**Blake, Lillie Devereux** (1835-1913), American reformer, was born at Raleigh, N. C. Her interest in woman suffrage dated from 1869. Author of *Woman's Place To-day* (1883), and several works of fiction.

**Blake, Robert** (1598-1657), English admiral, was born at Bridgwater, Somersetshire. Joining the Parliamentary force he became colonel. In 1649 he was appointed to command the fleet, and in the following year destroyed most of Prince Rupert's squadron at Malaga, in the south of Spain. In 1651 he captured the Scilly Isles and Jersey from the royalists. On his return to England he was summoned to Parliament by Cromwell, and after a period of peace was sent in 1655 with an expedition to teach a lesson to the pirates of Tripoli, Algiers, and Tunis. This he successfully accomplished. Blake was supremely honest, brave, patriotic, and ranks high among the very greatest of Englishmen. See Hepworth Dixon's *Robert Blake* (1852); a *Life* by Dr. Samuel Johnson (1777).

**Blake, William** (1757-1827), English mystic, poet, painter, and engraver, was born in London. From the age of four to the end of his life Blake had times of exaltation, when he saw visions which affected all his future work.

In 1784-87 he had a print-sellers' shop; but engraving was the practical business of his life. As painter and as poet Blake has been idolized and he has been reviled. His works, however, show him to be a true poet, a seer as well as a visionary. As a draughtsman and a designer he was full of masterly power; nevertheless his Wiertz-like conceptions and barbaric coloring seem at times the inspirations of sheer frenzy. After a long life of toil and neglect, Blake died in London, where he had mostly lived. His greatest works were the *Songs of Innocence* (1789) and *Songs of Experience* (1794), and his many pictorial designs, of which the most notable were his illustrations to the Book of Job (1826), Young's *Night Thoughts* (1777), and Blair's *The Grave* (1804-5). See his *Life*, by A. Gilchrist (1863 and 1880); *William Blake*, by A. C. Swinburne (1868); *Works*, very fully analyzed by E. J. Ellis and W. B. Yeats (1893).

**Blakely, Johnston** (1781-1814), American naval officer, was born near Seaford, Co. Down, Ireland, and was brought to Wilmington, N. C., when two years old. Blakely commanded the *Wasp* in the War of 1812, and received a gold medal from Congress for his capture of the British brig *Reindeer* in May, 1814. After taking several other prizes Blakely and the *Wasp* disappeared in October of the same year, and the vessel is presumed to have foundered.

**Blanc, Mont**, the loftiest mountain (15,782 ft.) in the entire chain of the Alps. It rises towards the s.w. end of the chain to which it gives its name, to the s. of Chamonix (France) and to the n.w. of Courmayeur (Italy). By the treaty ceding Savoy to France in 1861 it was agreed that the highest summit should become wholly French. It was originally named simply Les Glacieres, or the Montagne Maudite, the first certain occurrence of the name Mont Blanc being found in an Italian document of 1694. It was first ascended in 1786 by two Chamonix men—Dr. Paccard and Jacques Balmat. A railway now connects Chamonix and Aosta through a tunnel of 8 1-2 m. under Mont Blanc. See Charles E. Mathew's *The Annals of Mont Blanc* (1898). The best map (scale 1-50,000) is that by Imfeld and L. Kurz, published in 1896.

THE CHAIN OF MONT BLANC stretches from the Col de Balme (7,221 ft.), on the n.e., to the Col du Bonhomme (8,147 ft.) and the Col de la Seigne (8,242 ft.), on the s.w. and is mainly divided between Italy and France. See L. Kurz's *Guide de la Chaîne du Mont Blanc* (1892; and in English, same date).

**Blanc, Jean Joseph Louis** (1811-82), French historian and revolutionist, was born at Madrid. He was educated at Paris, where in 1839 he founded the *Revue de Progres*, printing in it his important work on socialism, the *Organisation du Travail*. A pamphlet on *Idees Napoleoniennes* was succeeded in 1841 by Blanc's *Historie de Dix Ans* 1831-40, which created an immense sensation, and by its revelations shook the throne of Louis Philippe. Upon the revolution in 1848, Blanc was elected a member of the provisional government. He was falsely charged with complicity in the disturbances of May, June, and August; and being condemned by a large majority, he sought refuge in Britain, where he remained for upwards of twenty years. Returning to Paris on the downfall of the empire, he afterward opposed Thiers, and denounced the conclusion of peace with loss of territory. Until his death at Cannes, in 1882, he was a deputy for Paris. See Edmund's *Louis Blanc, Celebrities of the Century* (1882), and the *Annual Register* for 1882.

**Blanca Peak**, mountain in Colorado, 10 m. n. of Fort Garland. It occupies an isolated position, and is one of the most magnificent of the Park Range, and with an altitude of 14,464 ft. is the next highest mountain in the United States to Mt. Whitney.

**Blanchard, Samuel Laman** (1804-45), English author and editor, was born at Great Yarmouth. After his death Bulwer-Lytton collected his prose essays, under the title of *Sketches of Life* (3 vols. 1846), and Blanchard Jerrold did the same for his poetical works (1876). See *Memoir in Sketches from Life*.

**Blanche, Dent**, one of the grandest peaks (14,318 ft.) of the Alps, near Zermatt, to the w. of which it rises, nearly opposite and n. of the slightly higher Matterhorn. This difficult climb was first made in 1862, by T. S. Kennedy and W. Wigram.

**Blanching Vegetables**. By the exclusion of light certain changes take place in the metabolism of plants. This fact is made use of by the gardener in growing certain vegetables which under normal conditions are tough, bitter, and harmful, yet when etiolated or blanched are tender and pleasant.

**Blanco, Cape**, on the w. coast of Africa, at the w. extremity of the Sahara.

**Blanco y Erenas, Ramon, Marquis de Peña Plata** (1831-1906), Spanish official born in San Sebastian, Spain. He was captain-general there during the Spanish-American war.

**Bland, Richard Parks** (1835-99), American

legislator, was born near Hartford, Ky. Member of Congress from Missouri. He is best remembered for his championship of silver which culminated in the 'Bland bill,' 1878, which provided for the purchase of silver sufficient for the coinage of \$2,000,000 a month in silver dollars which should be legal tender. See *Byar's Life* (1900). See **BI-METALLISM**.

**Bland, Theodorice** (1742-90), American patriot, was born in Prince George co., Va. He was a member of the Continental Congress, 1780-3, opposed the constitution in the Virginia convention of 1788, and was elected that year to the first congress of the United States. See the *Bland Papers*, edited by C. Campbell (1840).

**Blandy, William Henry Purnell** (1890-1954), American naval officer, born in New York City; educated at Univ. of Del. and U. S. Naval Acad. In Pacific Theatre, World War II; conducted atomic bomb tests at Bikini (1946); Admiral and Commander in Chief, Atlantic Fleet (1947-50).

**Blanket**, a covering for a bed or the bodies of men and animals. The best blankets are wholly composed of wool. Their manufacture is similar to that of other woolen goods, but the soft fluffy matting on the surface is obtained by a process called 'teaseling,' scratching it with teaseling-cards or brushes made of wire. The manufacture of blankets in the United States became an important industry after the Civil War, when the fine grades of wool produced in the far West were available for the manufacture. The American Indians of certain tribes, such as the Navahos and Chilkoots, weave blankets with interesting patterns, which are both warm and valuable for decorative purposes.

**Blank Verse**, a term which signifies, etymologically, all verse in which the rhymes are 'blank' or lacking, but which is generally restricted in ordinary usage to the unrhymed iambic decasyllable, the common medium in English of narrative and dramatic poetry. This measure was first used in our language, in the translation of the second and fourth books of the *Aeneid*, by the Earl of Surrey (1516-47), and was almost certainly copied from the *versi sciolti*, or unrhymed verse of eleven syllables of the Italians. Except for a brief period after the restoration, when the couplet and the 'heroic' play reigned supreme, its position as the only suitable dramatic verse has never been disputed. The special adaptability of the measure for dramatic purposes is generally attributed to the fact that it approaches nearer the language of ordinary

speech than any other English form of verse.

Dramatic blank verse had quite ceased to be written when Milton produced the first original example of narrative blank verse in his epic of *Paradise Lost* (1667). Milton's blank verse

employed blank verse in some of their compositions; but while they may have widened its range of application, none of them have innovated to any marked degree in the technique of the metre, and the verse remains substantially the old Miltonic blank verse. Meanwhile, in the dramas that continue to be written, British poets have reverted to the versification of the minor Elizabethans. Consult J. Addington Symond's *Blank Verse*; J. B. Mayor's *Chapters on English Metre*; Guest's *English Rhythms* (ed. Skeat).

**Blanqui, Jérôme Adolphe** (1798-1854), French political economist, was born in Nice. His chief work is *Histoire de l'Economie Politique en Europe*, first published in 1838.

**Blanqui, Louis Auguste** (1805-81), French revolutionist, was born near Nice. He took an active part in overthrowing Charles x. and as a result of his activities spent a large part of his life in prison. He is the author of *L'éternité dans les astres* (1872); his political writings were published under the title *Critique Sociale*. Consult Combes' *Portraits Revolutionnaires*; Geffroy's *L'Enfermé*; Da Costa's *Les Blanquistes*.

**Blantyre**, town, the capital of Nyasaland, Africa, 41 m. s.w. of Zomba. Blantyre was founded in 1876, being named for Livingstone's native town in Scotland; p. about 8,000.

**Blantyre**, parish and town, Lanarkshire co., Scotland; 3 m. n.w. of Hamilton. The village, known as Blantyre Works, is the birthplace of Livingstone, the African explorer; p. (parish) 18,153.

**Blarney**, village, county of Cork, Ireland; 4 m. n.w. of Cork. It contains an old castle, which occupies the site of a still older stronghold erected in 1446 by Cormac M'Carthy. The famous Blarney stone, built into the castle some twenty ft. from the top, is supposed to confer wonderful powers of persuasion upon those who kiss it.

**Blasco Ibañez, Vicente** (1867-1928), Spanish novelist, was born of Aragonese parents. He was frequently imprisoned in his youth for political offences, and became leader of the Republican party in Spain. His writings reflect his militant zeal in behalf of justice and brotherhood. They include *The Shadow of the Cathedral*, *The Four Horsemen of the Apocalypse*, *Mare Nostrum*, *Blood and Sand*.

**Blashfield, Edwin Howland** (1848-1936), American painter, was born in New York City, and studied in Paris under Bonnat and Gerôme, and at the Royal Academy, London. On his return to the United States (1881), he became known for his mural work,



Engraving by Blake: 'The Morning Stars sang together' (Job 38:7)

was received with little favor by his own generation. The measure languished while the influence of Pope prevailed, but it revived in Young's *Night Thoughts* (1742) and Thomson's *Seasons* (1726-30), and was continued in Akenside's *Pleasures of the Imagination* (1744) and Cowper's *Task* (1785) into the period of romantic revival proper. There are few of the 19th century poets who have not

examples of which may be seen on the great central dome of the library of Congress, in the Minnesota, Iowa, Wisconsin, and South Dakota State capitols, in the New York Appellate Court, the chapel of the College of the City of New York, and in a number of private houses. He was president of the National Institute of Arts and Letters, 1915-16. Among his canvases are *The Angel with the Flaming Sword* and *Christmas Bells*. He wrote, in conjunction with his wife, *Italian Cities* (1900), and an English edition of Visari's *Lives of the Painters* (1897).

**Blasius, St.**, bishop of Sebaste, Cappadocia, martyred by Agricola in 316. He was considered a guardian saint against throat diseases, for relief from which his blessing is still invoked on his day (Feb. 3). The stories of his life and works are purely legendary.

**Blasphemy**, in English and American law, the criminal offense of maliciously and publicly contemning God, Christ, the Bible or the Christian religion. Although formerly denial of the accepted doctrines of Christianity was punishable as blasphemy, the offense today comprises only those expressions designed to wound the feelings of mankind, to excite contempt and hatred against religion or the church, or to promote immorality. In some of the United States blasphemy is no longer punishable as a separate offense.

**Blass, Friedrich** (1843-1907), German classical scholar, was born in Osnabruck, Hanover. He published or revised the text of all the important Greek orators.

**Blasting**, the method of shattering masses of solid matter by means of explosives. Gunpowder was first adapted to mining in Germany about 1613 and was introduced into England toward the end of that century. Invention of new methods of blasting proceeded slowly, and not until 1846 were the high explosives, such as guncotton and nitroglycerin, discovered. Blasting is now widely adapted to such operations as mining and quarrying (qq.v.) and tunnelling (see TUNNELS and TUNNELLING).

The principal explosives in ordinary use are black powder; dynamite; blasting gelatin, composed of guncotton and nitro-starch dissolved in nitroglycerin; trojan powder; rackarock; and mercury fulminate, an extremely sensitive and dangerous compound made by dissolving mercury in nitric acid and immersing this solution in common alcohol. (See EXPLOSIVES.) Three methods of blasting are practicable: (1) the small-shot system; (2) the mine system; (3) surface blasts.

**Blasting Gelatin**. See **Blasting**.

**Blastoids**, a class of Echinodermata comprising small calcareous fossils occurring, for the most part, in the Carboniferous limestone. Blastoids are characterized by the presence of the hydrospires—five convoluted calcareous tubes communicating with the exterior and carrying a current of water to aerate the blood. The commonest genus is the *penetremites*.

**Blastomycosis**, a suppurative and granulomatous process affecting chiefly the skin and sometimes also the deeper structures, due to infection with one or more closely allied species of fungi.

**Blavatsky, Helena Petrovna Hahn-Hahn** (1831-91), theosophist leader, was born in Ekaterinoslav, Russia. Following her unhappy marriage to General Blavatsky in 1848, she spent much of her life in travel, visiting practically every point of the globe. In 1871 she founded in Egypt a short-lived society for the purpose of investigating spiritualistic phenomena. In 1873 she arrived in New York City where, with the assistance of W. Q. Judge and others, she founded the Theosophical Society in 1875. She again travelled in the East and in Europe, spending the last years of her life in London. Her works include *Isis Unveiled* and *The Voice of the Silence* (1880). See THEOSOPHY; THEOSOPHICAL SOCIETY.

**Blaydon**, town, Durham, England, on the river Tyne; connected by bridge with Newcastle; p. 33,064.

**Blazon**, **Blazonry**, **Blazoning**, the art of describing a coat of arms by defining in technical language its component figures, their positions, and their tinctures. See HERALDRY.

**Bleaching**, the art of removing the natural color of vegetable and animal products in such a way as not to injure them and to have them as white as possible. The process of bleaching by chemical methods is of comparatively modern date, the methods employed in earlier times having been dependent principally upon the action of light and air. In 1785 the bleaching properties of chlorine were discovered, and the fact that limewater saturated with chlorine gas made a most effective bleaching solution revolutionized the industry.

The 'American Process,' which consists of singeing, washing, boiling with lime, souring with weak acid, boiling under pressure with alkali and resin soap, steeping in a solution of bleaching powder, souring again with weak acid, washing, and drying, came into vogue about 1837, and, with improvements, is still in general use. There are three kinds of bleach:

the madder bleach, the market bleach and the Turkey-red bleach.

An electrical process is also used in which the bleaching liquid is obtained by passing an electric current through solutions of sodium or magnesium chlorid, or a combination of these chemicals. See Trotman's *The Bleaching, Dyeing and Chemical Technology of Textile Fibers* (1925); J. T. Marsh's *An Introduction to Textile Bleaching* (1948).

**Bleaching Powder**,  $\text{CaOCl}_2$ , a compound formed by passing chlorine gas over cold slaked lime. When freshly made it consists of an oxychloride of calcium, but by the absorption of moisture it is gradually converted into a mixture of chloride and hypochlorite of calcium. It is commonly known as chloride of lime, and is used as a source of chlorine for bleaching purposes, also as a disinfectant.

**Bleak**, a Cyprinid fish allied to the bream. The scales are used in the manufacture of artificial pearls.

**Bleeding**, or **Blood-letting**, is commonly resorted to in surgical practice for the relief of congestion; and in this sense the term covers many different methods by which blood may be removed from the body—e.g. venesection or phlebotomy, cupping, and the use of leeches. Bleeding, after having been terribly misapplied for many generations and then practically abandoned, is now advocated in certain cases of acute inflammation in suitable subjects, or to relieve an overburdened heart. See HAEMORRHAGE; WOUNDS; VENESECTION.

**Bleek**, **Friedrich** (1793-1859), German Biblical scholar, was born in Ahrensböck in Holstein. He became professor of theology at Berlin (1823), and at Bonn (1829). His commentary on *Der Brief an die Hebräer* (1828-40) ranks among the foremost exegetical studies.

**Bleek**, **Wilhelm Heinrich Immanuel** (1827-75) German philologist, son of Friedrich Bleek, was born in Berlin. His published works include *Languages of Mozambique* (1856); *Handbook of African, Australian, and Polynesian Philology* (1858-63); the unfinished but important *Comparative Grammar of South African Languages* (1862-9); *Origin of Language* (1869).

**Bleiberg**, village, Austria, in Carinthia, 9 m. w. of Villach; p. 5,000.

**Bleibtreu**, **Georg** (1828-92), German painter of battle scenes, was born in Xanten, on the Rhine. He was noted for his war paintings which include *The Battle of Baw, in Schleswig*. *The Attack on the Grimma Gate at Leipzig* and

*the Battle at Waterloo* (1858), and *Napoleon retiring after Waterloo*.

**Bleibtreu**, **Karl** (1859-1928), German man of letters, was born in Berlin. His published works include somewhat turbulent descriptions of battles (*Dies Irae . . . Sedan*, 5th ed. 1902); books about Napoleon (1888, 1891); Frederick the Great (1888, 1892); Byron (1886, 1897); English literature (1887-8).

**Blekinge**, county in Southern Sweden, with an area of 1,173 sq. m., 35 per cent. of which is forest. For practically eight centuries it belonged to Denmark, but was ceded to Sweden in 1658 by the peace of Roskilde; p. 147,098.

**Blenmyses**, ancient people of Hamitic origin, who lived in the south of Egypt.

**Blende**, a name given to sphalerite or zinc-blende by the early miners.

**Blenheim**, or **Blindheim**, village, Germany, in Bavaria, near the left bank of the Danube, 23 m. n.w. of Augsburg. Near here, at Höchststadt, on Aug. 13, 1704, the Duke of Marlborough and Prince Eugene, commanding the combined armies of the allies (England, Germany, Holland, and Denmark), defeated the French and Bavarians under Tallard, Marsin, and the elector of Bavaria.

**Blenheim Park**, parish, England, near Woodstock, Oxfordshire, on the Glyme River. The name of the park was changed when Queen Anne granted it to John Churchill, Duke of Marlborough, for his famous victory at Blenheim in 1704.

**Blenk**, **James Hubert** (1856-1917), American Roman Catholic prelate, was born in Neustadt, Bavaria. He became bishop of Porto Rico in 1899, and archbishop of New Orleans in 1906.

**Blenker**, **Louis** (1812-63), German-American soldier, was born in Worms, Hesse-Darmstadt, Germany. Blenker's regiment was a part of the division which covered the retreat at the first battle of Bull Run, and he was promoted brigadier general, Commanding a division in the Army of the Potomac during the remainder of his service.

**Blenkinsop**, **John** (1783-1831), inventor of what may be considered the first commercially successful locomotive steam-engine, a cog-wheeled engine which was employed on Hunslet Moor, near Leeds, to draw coal up to a load of thirty tons (1812 *et seq.*). George Stephenson saw Blenkinsop's engine at work before building his famous *Rocket*.

**Blennerhasset**, **Harman** (1765-1831), English immigrant of Irish descent in America, remembered for his connection with the Aaron

**Burr Conspiracy.** In June, 1807, he was indicted, with Burr, for misdemeanor and treason, but on Burr's acquittal he was released and passed the last years of his life in poverty.

**Blennorrhoea.** See **Gonorrhoea**.

**Blenny**, a name given to the members of the family Blenniidae, which includes a large number of small littoral fishes, all having the ventral fin formed of less than five rays, and jugular in position, as in the cod family.

**Blepharitis**, a chronic inflamed condition of the eyelids.

**Bleriot, Louis** (1872-1936), French aeronaut, was born in Nantes. The monoplane called by his name is notable for its simplicity, stability, and lifting power. On July 25, 1909, he flew across the English Channel from Barakues to Dover in 37 minutes.

**Blessington, Marguerite**, Countess of (1789-1849), Irish novelist and writer, was born in Knockbrit, Tipperary. She was an intimate friend of Lord Byron; held a little court for many years at Gore House, Kensington. She is the author of *The Idler in France* (1841), *The Idler in Italy* (1841), and *Conversations with Lord Byron* (1834). She also wrote a number of novels.

**Blowfields.** See **Bluefields**.

**Blicher, Steen Steensen** (1782-1848), Danish novelist and poet, was born in Vium, a village of Viborg. Beginning with *En Landsbydegns Dagbog* (1824), he wrote a whole series of masterly tales of Danish, especially Jutish, peasant life, culminating in *E Bindstouw* (1842), written in the Jutland dialect, and incomparably his best work. Consult his own *Autobiography*, prefixed to his *Samlede Noveller*; Kristensen and Lund's *Blicher's Liv og Gjerning*.

**Blicking Homilies.** The unique MS. of the Blickling Homilies is at Blickling Hall, near Aylsham, in Norfolk, England. They belong to the time between Alfred and Ælfric; they are not homogeneous in character, and may cover a wide period of time. The date 971 occurs in one passage. These homilies, full of legendary, apocryphal, unscriptural matter, form a striking contrast to those of Ælfric (q.v.), who, as is clear from several passages, intended some of his own homilies as a corrective to them.

**Blida**, fortified town, Algeria, 23 m. s.w. of Algiers, at the foot of the Atlas Mountains. It is famous for its orange groves; p. 24,758.

**Bligh, William** (1754-1817), English admiral, entered the navy and sailed under Cap-

tain Cook in his second voyage round the world (1772-4). In 1787 he was sent by the government as commander of the *Bounty* to Tahiti. During their six months' stay on the island his men became completely demoralized, and mutinied. On April 28, 1789, Bligh, with eighteen men, was cast adrift in an open boat, while the mutineers turned back to Tahiti, and ultimately settled on Pitcairn's Island. After almost incredible hardship, Bligh arrived at the island of Timor, near Java, having sailed 3,618 miles. (See **BOUNTY, MUTINY OF THE**.) In 1805 he was governor of New South Wales, but was so harsh as to cause general dissatisfaction; and in 1808 the officers of the colony arrested him. He was kept in prison for two years. The officer who arrested him was tried in England and cashiered. After Bligh's return home he was raised (1811) to the rank of admiral.

**Bligh Islands**, a portion of the Fiji Archipelago, in nearly 180° long.

**Blight**, a diseased state of cultivated plants, especially cereals and grasses. The term has been vaguely and variously used having, in fact, been applied by agriculturists to almost every disease of plants in turn, however caused, especially when the plant dies before reaching maturity. Botanists have restricted the term to parasitic diseases due to (a) bacteria or microbes, (b) parasitic fungi.

**Blight, Fire, or Pear Blight**, a disease that attacks apple and pear trees and other fruits. The disease affects the bark, which falls off, and thus causes the death of the tree. It is due to certain aphids, the fruit-tree bark-beetle, the apple leafhopper, and the false tarnished plant-bug. Consult the publications of the U. S. Department of Agriculture.

**Blimbing**, or **Bilimbi**, a pulpy, yellowish, acid fruit, about the size of a hen's egg, and found on the cucumber tree (*Averrhoa bilimbi*) of the order Oxalidaceae.

**Blind.** See **Blindness**.

**Blind, Karl** (1826-1907), German author and revolutionist. He furthered the Schleswig-Holstein movement, and fought in the war of 1870-71. His writings range over Germanic history, literature, and folklore, as well as politics.

**Blind Fish.** In situations where light is absent, blind animals are commonly found. The absence of the normal stimulus has necessitated cessation of function and various degrees of degeneration in structure. In most cases rudimentary traces of eyes prove the fact of degeneration; and that the latter is

largely the direct effect of the absence of the stimulus preserving the health of the eye is allowed by most.

**Blind Harry.** See *Henry the Minstrel*.

**Blindness.** In medical terminology the expression 'blindness' means absolute sightlessness; what is popularly termed 'partial blindness' is known medically as Amaurosis or Amblyopia. (See *AMBLYOPIA*.) Blindness cannot always be accounted for. In general, it may be said to arise from inflammatory or degenerative changes in some part of the path between the cornea without and the visual center (or that part of the gray matter of the brain especially concerned in sight) within. Blindness is either congenital or acquired. Hereditary blindness, constituting nearly one fourth of all cases, cannot be controlled.

The various forms of eye disease, such as Cataract, Keratitis, Iritis, and Retinitis, are treated under their several headings. One, however—*viz.*, *Ophthalmia Neonatorum* (sore eyes of the new-born)—is particularly mentioned here because of its special importance. The disease starts with superficial inflammation of the eyes, caused by contagion during birth. It leads to ulceration and rapid destruction of the eyes, and is extremely contagious, being readily transmitted from the child to any one having to do with it.

Nearly three-fourths of all blindness in the United States is due to diseases and the rest to external causes. Of the diseases that cause blindness, over two-thirds are special eye diseases, the rest are of more general, nature, such as measles, meningitis and scarlet fever. Cataract causes about one-seventh of all blindness due to disease. Venereal disease is responsible for about one-seventh of all blindness in the United States.

**Blindness, Color.** See *Color Blindness*.

**Blind Spot in the Eye,** that part of the retina which is pierced by the optic nerve, and which is insensible to light.

**Blindstory,** in architecture, the middle story of a large church, over the pier arches and under the clerestory windows. The technical name is 'triforium,' as the gallery or open space between the vaulting of the nave and the roof of the aisles generally opens on the nave by triple apertures.

**Blind Tom** (1849-1908), musical genius, was born in Georgia, the son of negro slaves. He was born nearly blind and half idiotic, but possessed the faculty of playing music by ear, after hearing the air. He gave concerts all over the United States and in Europe.

**Blind, Training of the.** Although there

were occasional illustrious blind people before the latter part of the 18th century, the first effort to ameliorate the condition of the blind in general was begun at this time.

The philanthropist Valentin Haüy (1745-1822), in 1784 founded in Paris the first school for the blind, the *Institution Nationale des Jeunes Aveugles*, and commenced the first printing in raised characters.

The work of Haüy, the great apostle of the blind, was taken up by Klein of Vienna, by Zeune of Berlin, and by others on the Continent; in Britain especially by Gall of Edinburgh and Alston of Glasgow. Later, every country in Europe came to support one or more residential schools for the blind. Comparatively little has yet been done in Asia and Africa.

In the United States, citizens of Boston, New York, and Philadelphia started our three pioneer schools. In 1829 Dr. John D. Fisher founded the first of these, in Boston. He had visited the Paris school, but the one he established soon surpassed those of Europe. State aid was secured from the start; private interest was aroused and maintained; and Dr. S. G. Howe, the Philhellene, became director, and remained during his long life the leader in this branch of education. A wealthy merchant, Col. T. H. Perkins, gave the enterprise a mansion, valued at \$30,000—hence the name Perkins Institution; and the new school was opened in 1831. Dr. Howe's instruction of Laura Bridgman began in 1837, and his success commanded attention throughout the whole world. The New York institution was also opened in 1831, actually a few months before that in Boston, under Dr. John D. Russ, another Philhellene. The Philadelphia Institution, founded in 1833 by the Society of Friends, secured as its first principal Julius Friedlander, who had had European experience.

These three schools began as private corporations, and remain so to this day, but they have received State grants almost from the start and are largely supported by the State. Through exhibitions of their pupils, public interest was aroused, the first State school for the blind being established in Ohio in 1837. Now every State conducts a residential school or arranges to send its blind children to a similar school in a neighboring State. In 1930, 106 cities reported special classes and schools for the blind located in 23 States and caring for 5,000 pupils.

The American aim in the education of the blind is to provide the best and most comprehensive schooling obtainable, to graduate the



greatest possible number with high-school diploma and vocational training in one or more pursuits, and to expect these to make good in the world. Many blind men and women attend the regular colleges and universities. State departments or commissions were (1933) organized in 26 States to care for the general needs of the blind.

In 1872, Dr. (later Sir) Francis Campbell, an American and blind, founded in London, England, the Royal Normal College and Academy of Music for the Blind, a residential school furnishing unexcelled vocational opportunities in school teaching, music, and piano tuning; and the remarkable success of its graduates has powerfully affected the aims of the other schools of Great Britain and Ireland.

Desiderata for blind children include specially designed playgrounds, and school curricula embracing memory training and manual instruction. All children of promise should be taught typewriting, and in as many cases as possible musical instruction should be given.

Most of the schools for the blind are residential. This must be so for blind children in rural districts, where special apparatus required for proper training and the wide opportunities for a rich and full life during youth, are totally lacking. But cities like London, Berlin, Chicago, Milwaukee, and New York have created day school centers for the blind and these have been made to thrive to a marked degree. This day school plan is dictated mainly by a conviction that even handicapped children will be the better assisted in life by going to school with other children with whom they will have to live and compete in the world. But fitting blind children into the public school system involves an expenditure for physical, musical, domestic and manual training beyond what is usually required for the seeing child. Until this is provided, residential schools must offer opportunities in the various practical and inspirational activities of the times—as in the case of the New York Association for the Blind.

*Types and Printing.*—To Haüy belongs the honor of being the first to emboss paper (1784) as a means of reading for the blind. His books were embossed in large and small italics, from movable type set by his pupils. Many other such systems, known as line type, were invented during the next fifty years, but in 1829 Louis Braille, one of the greatest benefactors of the blind, a blind music teacher in the Institution des Jeunes Aveugles, Paris, devised an alphabet in which the characters are formed

by an arrangement of dots. The signs of the *Braille Alphabet* are purely arbitrary, and consist of varying combinations of six points

placed in an oblong, thus: . . of which there

are sixty-three possible combinations. Such a point type has the double advantage of superior tangibility and superior writability; and it further supplies a complete mode of expression for words, music, and mathematics. This alphabet, with modifications, prevails in most countries. In 1932 it was decided to use uniform type in Braille for all English finger-reading publications.

For writing the point alphabets, simple and ingenious slates have been constructed. Two American superintendents, Hall of Illinois, in 1892, and Wait of New York, in 1893, brought out the first practical point typewriters, the Braillewriter and the Kleidograph. Similar but heavier machines by the same inventors, the Stereotypemaker, in 1893, and the Stereograph, in 1894, by which embossed metal plates can be rapidly made ready for an indefinite number of paper impressions, have greatly cheapened and facilitated the means of printing for the blind. Many devices have been contrived to enable the blind to keep the line apart when writing with lead or fluid pencil.

In 1882 William Moon planted in Philadelphia the English institution of teaching the adult blind in their homes. Before this, except in a few working homes, little had been systematically done to aid the adult blind. Since 1900 a wave of interest in their behalf has spread over the United States, and since the World War I over the entire world and we find private associations and public commissions both training and employing numbers of men and women and assisting them to self-support. Commercial enterprise usually affords the best opportunity for success for the blind man with business ability. But most employed blind people are wage-earners. Sheltered workshops, operating at a loss are found in most large cities. These are supported by taxation or charity. A fourth class of blind people work in their homes under the supervision of a central agency. Farming, retail dealing, life insurance selling, book-binding, and telephone switchboard operation are occupations taught to the blind. In addition to music, European schools for the blind give instruction in caning chairs, making brushes, basket-weaving, knitting, netting, book-binding, making wicker cases for bottles, and operating telephones.



But musical training, and the tuning and repairing of pianos, is emphasized, particularly in France.

Since 1879 the United States government has subsidized with \$10,000 annually the American Printing House for the Blind at Louisville, Ky. It publishes in several languages, and distributed literature in all parts of the world, especially to the European war-blinded, in the last case, without charge. From this institution every school in the country has been able to draw embossed books, without expense, in proportion to the number of its blind pupils. Practically all the State libraries and many public city and school libraries maintain departments of embossed books, which furnish abundant instruction and relaxation to thousands of readers. In 1933 there were 252 magazines and periodicals for the blind published in 30 different countries in 20 languages.

There has existed since 1853 an organization called the American Association of Instructors of the Blind; and, since 1895, the American Association of Workers for the Blind. In 1921 the American Foundation for the Blind was incorporated, its purposes being to collect and disseminate information regarding all phases of work for the blind, to promote State and Federal legislation in behalf of the blind, to arrange for the establishment of needed agencies for the blind, and to assist in increasing the efficiency of work for the blind in all particulars.

At the Perkins Institution, Watertown, Mass., may be consulted a special library about blindness and the blind; also an historical museum of objects and appliances, used for their convenience, instruction, and amusement.

In 1947 Dr. Zworykin invented an electronic reading aid for blind people. Holding in his hand an instrument resembling a fountain pen the blind person moves it over the letters on the printed page. The light on the point of the "pen" reflects that of the letter, and acting on a radio tube produces sounds. The person learns through practice how to identify the letters.

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*to the Unseen Environment* (1950); Thomas D. Cutsforth's *The Blind in School and Society* (1951); Ishbel Ross' *Journey Into Light; the Story of the Education of the Blind* (1952); Russel Criddle's *Love is Not Blind* (1953); Publications of the American Foundation for the Blind.

**Blindworm, or Slow Worm** (*Anguis fragilis*), a limbless lizard found throughout Europe, and in North Africa and Western Asia. Related species occur also in the warmer parts of America. The name Blindworm or Blind Snake is also bestowed on *Ophisaurus ventralis*, a harmless 'glass snake' found throughout the United States from Florida to Illinois. See GLASS SNAKE.

**Bliss, Cornelius Newton** (1833-1911), American public official, was born in Fall River, Mass. He served as Secretary of the Interior from 1897 to 1899.

**Bliss, Frederick Jones** (1859-1937), American archaeologist, born in Syria, educated at Amherst College. He wrote *A Mound of Many Cities* (1894); *The Religions of Modern Syria and Palestine* (1912).

**Bliss, Philip Paul** (1838-76), American evangelist, was born in Clearfield, Pa.

**Bliss, Porter Cornelius** (1838-85), American journalist, was born in Erie co., N. Y. In 1870 he was secretary of legation in Mexico; and in 1874 engaged in encyclopaedia work in New York, and edited *The Library Table*.

**Bliss, Tasker H.** (1853-1930), American soldier, was born in Lewisburg, Pa. From 1905 to 1909 he was stationed in the Philippines as commander of various departments. In 1909 he became a member of the General Staff, and president of the Army War College. In 1915 he was appointed assistant chief of staff, and the same year became a major-general. Shortly after the American declaration of war (April, 1917) General Bliss became Acting Chief of Staff; in September succeeded Gen. H. L. Scott as Chief of Staff; and one month later, when the grade of general was revived, was appointed to that grade with General Pershing. In January, 1918, it was announced that he had been appointed to represent the United States on the Supreme War Council of the Allies.

General Bliss died at Washington in 1930. His biography *The Life and Letters of Tasker Bliss*, by Frederick Palmer, was published in 1934.

**Blister**, a vesicle caused by a deposition of serous fluid beneath the skin, in consequence of a burn, the application of a vesicant, or disease, or friction. The same name is given

to the therapeutic medium by which the blister is produced.

**Blistering** is the application of a vesicant near an inflamed part; it should not be directly over it, nor where the skin is loose, nor over any prominence of bone. A blister first acts as a local stimulant; if kept on long enough it causes a large discharge of serum, and so acts as a depletive and depressing agent. A blister over the heart will stimulate its action.

**Blister Beetle**, a popular name for a number of beetles in two distinct families, Meloidae and Cantharidae. The name refers to the vesicating or blister-raising properties of their body juice. The Spanish Fly and the Oil Beetle are familiar illustrations. The life history is often remarkable. The important genera are: (1) *Lytta* or *Cantharis*, (2) *Mylabris*, (3) *Cercocoma*, (4) *Meloe*. See **CANTHARIDES**.

**Blister Rust**, a disease deadly to all five needled pines. It spends part of its life cycle on gooseberry and currant plants.

**Blizzard**, a fierce and blinding snow storm accompanied by high north winds and a rapid fall of temperature. The gale drives before it a fine, dry, icy snow, the flakes being virtually ice dust about one-twentieth of an inch in diameter. In severe blizzards the wind will blow at the rate of fifty miles an hour, with the thermometer at 62° below freezing point; and it has been known to blow for 100 consecutive hours at the rate of over forty miles an hour. Blizzards are most common in the Western States and Canada, but may extend as far east as New York and as far south as Texas.

In some districts blizzards are looked for three or four times in a winter; but really disastrous ones are rare—those of 1836, of December, 1863, January, 1866, and January, 1873, being, until 1888, the severest on record. In the blizzard which visited the Dakotas, Montana, Minnesota, Nebraska, Kansas, and Texas in January, 1888, the thermometer fell within twenty-four hours from 74° above zero to 28° below in some places, and in South Dakota went down to 40° below zero. In March, 1888, a severe blizzard afflicted the North Atlantic States, when snow fell to the depth of more than three feet, and was piled into drifts as high as twenty feet. The last mentioned is frequently alluded to as 'The Blizzard.' The most recent blizzard occurred in November, 1913, when a fierce storm visited the region of the Great Lakes.

The word, which seems to be akin to *blast*, *Muster*, first became usual throughout the United States during the severe winter of

1880-81, but was in colloquial use in the West early in the century. The U. S. Weather Bureau predicts and traces these storms. See **STORM**.

**Bloch, Carl Henrik** (1834-90), a leading modern representative of Danish national painting. He studied at the Copenhagen Academy (of which he was appointed professor in 1871), and painted Zealand and Jutland peasant life—e.g. *The Dinner*, *The Fishermen's Home*—between 1854 and 1859. In Rome (1859-65) this many-sided artist painted the humorous side of monastic life, and became a historical painter.

**Bloch, Jean de** (1836-1902), Polish banker and author, was born of Jewish parents, and was educated in Warsaw. In 1808 he wrote *The War of the Future* (6 vols.), of which part has been translated into English under the title *Is War Now Impossible?* (1899). The thesis of the last work, which has provoked considerable discussion, is that war between the great powers is no longer possible as the arbiter of international disputes. After analyzing present conditions of armament and defence he deduces that modern wars will be long wars, and must necessarily result in economic exhaustion, entailing starvation and the dislocation of the social fabric. At best they will result in a 'kind of stalemate,' with no decisive issue.

**Block**, in the rigging of a ship, is part of the apparatus for raising sails and yards, tightening ropes, etc. The block comprises both the frame or shell, and the pulley or pulleys—usually termed 'sheaves'—contained within it. All the blocks on board ship have distinctive names—e.g. *cat block*, *cheek block*, *clew garner block*, *clew line block*, *boat block*, *snatch block*, etc. Ships' blocks are usually made of elm, and the sheaves of lignum vitae. Blocks made wholly of iron are used about the decks of ships, but are ill adapted for use in ships' rigging, on account of the chafing and fraying entailed. See **PULLEY**.

**Blockade**, in a military sense, is an operation for capturing an enemy's town or fortress, often without a bombardment or regular siege. The attacking party throws up works on the neighboring heights and roads, so as to guard every exit from the town. The rest of the besieging force remains under cover, ready to repel any sortie.

Blockade, in a naval sense, is the prevention of the entrance or exit of the enemy's ships at a particular port, or at all the ports on a stretch of coast, excluding also neutrals. For a valid blockade it is necessary that a state

of war should exist; that the blockade be really effective—that is to say, it must be maintained by a force sufficient to prevent access to the enemy's port; and neutral nations must be informed by the blockading power.

There are various rules in regard to blockade that have been adopted by common consent for convenience. A ship, for instance, is not liable to capture if, on arriving at the scene of blockade, her papers show that she began her voyage in ignorance of it, and was directed to make inquiry, and to proceed, if necessary, to an alternative destination. A vessel, further, for the sake of humanity, is allowed, if in danger or distress, to enter a blockaded port. If a neutral ship be in port when a blockade begins, she is given fifteen days for clearing. Mail steamers, on condition that no contraband of war is carried, are allowed in and out of a blockaded port. In the Mexican War, British mail boats ran in and out of Vera Cruz. Neutral men-of-war have often been allowed entry to blockaded ports. In an economic sense, blockade, as a police force, is a decisive force in modern warfare.

See CONTRABAND OF WAR; NEUTRALITY; PRIZE OF WAR. Consult Hobart Pasha's *Sketches from My Life*; T. S. Taylor's *Running the Blockade*; Louis Guichard's *The Naval Blockade*; E. C. Stowell's *International Law*; L. M. Spaight's *Air Power and War Rights*; and publications of the U. S. Naval Institute.

**Block Books**, books printed from engraved wooden blocks, one block generally serving for an entire page. A large number of these were produced in Central Europe, chiefly in Germany, also in Holland, during the years that immediately preceded (say 1435 onward) the invention of typography, or printing from small movable types. Only one side of the paper was printed, two blank sides being afterward pasted together. See BIBLIA PAUPERUM.

**Blockhouse**, originally a detached fort blocking or covering the access to a landing, a narrow channel, a mountain pass, a bridge, or other strategical point. It may be constructed of timber, stone, or metal, and is loopholed and embrasured for rifle firing.

**Blocking Course**, in masonry, a course of stones laid above a projecting cornice, in order that its weight may prevent the latter from falling, where the center of gravity of the cornice is rather far forward.

**Block Island** (formerly MANISEES), an island forming part of Newport county and the town of New Shoreham (whose p. in 1950 was 848), 10 m. s. of the mainland of Rhode

Island, some 8 m. in length, and varying from 2 to 5 m. in width.

**Blockberg**. See BROCKEN.

**Block Signal System**. See RAILROADS, *Block System*.

**Blodget, Lorin** (1823-1901), American physicist and statistician, was born near Jamestown, N. Y. He published *Climatology of the United States and of the Temperate Latitudes of the North American Continent*.

**Bloemfontein**, capital of the Orange Free State, South African Union; 750 m. by rail n.e. of Cape Town. It is pleasantly situated in the open veld at an elevation of 4,518 ft., and has a dry, healthy climate. Bloemfontein is the commercial center of the province, and has a large trade in wool. During the South African War it was occupied by the British under Lord Roberts; p. 67,241.

**Blois**, town, France, capital of the department of Loiret-Cher, is situated on the right bank of the River Loire. It is the seat of the famous chateau of the family of Orleans, a splendid Renaissance structure finely restored since 1845, which has been the scene of many interesting historical events; p. 26,774.

**Blomfield, Charles James** (1786-1857), bishop of London, was born at Bury St. Edmunds. He became bishop of Chester in 1824, and then bishop of London, 1828-56. During his London episcopate more than two hundred churches were built, and he was also mainly instrumental in establishing the Colonial Bishops' Fund. Consult his *Memoirs*.

**Blondel**, famous minstrel of the 12th century, a native of Nesle in Picardy; was the friend of his fellow minstrel, Richard Coeur de Lion, king of England.

**Blondin, Charles** (1824-97), acrobat and tight-rope walker, whose real name was JEAN FRANCOIS GRAVELET, was born at St. Omer. He engaged in a tour through the United States; crossed the Niagara Falls many times on a tight rope.

**Blood**, the red fluid which circulates through the heart, arteries, capillaries, and veins, supplying nutrition to all parts of the body, and conveying waste substances from the tissues to those organs by which they are excreted. In man and in all other mammals, with the single exception of the camel in which the shape is elliptical, the red corpuscles are minute circular discs, biconcave and entirely devoid of any central kernel or nucleus. In all other vertebrate animals, including birds, reptiles, amphibians, and fishes, the red corpuscles are oval in shape, and contain a large central oval body.

Human blood is bright red in the arteries, dark in the veins, of an average specific gravity of 1.055, of a salt taste, faint odor, an alkaline reaction, and a temperature of  $100^{\circ}\text{F}$ . in the interior of the body, but lower in the extremities and on the surface. It holds in suspension large numbers of cells or corpuscles. The fluid itself is called the plasma or liquor sanguinis. The corpuscles are of two kinds—red and white. The red give the color to normal blood; they contain a pigment, haemoglobin, a complex proteid substance containing about 0.4 per cent. of iron.



*Blood Corpuscles.*

*a*, Red corpuscle; *b*, the same in profile; *c*, red corpuscles in rouleaux; *d*, crenate red corpuscles; *e*, finely granular colorless corpuscle; *f*, coarsely granular; *g*, amoeboid forms.

The white corpuscles, or leucocytes, though much less numerous than the red ones, have important functions. Some of them, termed phagocytes, devour bacteria, dead or degenerate tissue, the products of inflammation, etc., and so have been called 'blood scavengers.' But they not only destroy what is effete; their normal secretions have been shown to be essential to the economy of the body.

Other solid elements in the blood are blood plates, round bodies less than half the diameter of red corpuscles. They are rich in phosphates and glycogen, and are supposed to aid in coagulation. In the red cells the main constituents are haemoglobin, lecithin, cholesterol, and salts of potassium, sodium, iron, calcium, and magnesium. There is about 70 per cent. of water. The haemoglobin, which takes up oxygen in the lungs and carries it to all the tissues, is by far the most important constituent. The leucocytes are rich in a proteid 'nucleo-histin' and the large proportionate quantity of phosphorus in the cells depends mainly on this substance and on lecithin. (See LEUCOCYTHAEMIA.)

While blood corpuscles and plasma form normal blood, clotted blood consists of clot and serum. The plasma is alkaline, yellowish

in tint, of sp. gr. 1.026-1.029; 100 parts of plasma contain water 90.3, and solids 9.7. The characteristic proteids of serum are serum globulin, serum albumin, and fibrin ferment; those of the plasma are fibrinogen, serum globulin, and serum albumin. The gases of plasma and serum are small quantities of oxygen, nitrogen, and carbon dioxide.

Methods have been devised for estimating the total quantity of blood, the volume of the corpuscles and plasma, the specific gravity, and the alkalinity. The quantity of haemoglobin is estimated by color tests, and the number of red corpuscles within a given volume is counted under the microscope in the haemocytometer. The bacteriological examination of blood has yielded valuable results, as, for example, in 'Widal's reaction,' which is valuable in the diagnosis of typhoid fever. The recently discovered test of the opsonic index of the blood is an important aid in diagnosis and treatment. See ANAEMIA; BLOOD PRESSURE; BLOOD VESSELS; CIRCULATION OF THE BLOOD; CHLOROSIS; OPSONIC INDEX; SERUM THERAPY. Consult Glynn, J. H., *Story of Blood* (1948); Marriott, H. J. L., *Medical Milestones* (1952).

**Blood, Avenger of**, a title given to one who pursued a manslayer to avenge the death of his kinsman. Hebrew law stands between primitive custom, which puts the duty of



*Bloodroot.*

(*Sanguinaria canadensis*).

avenging murder on the kin of the murdered, and modern law, which puts it on the state.

**Blood Bank**, see BLOOD PLASMA.

**Blood, Corruption of**. See Attainder.

**Blood, Thomas** (c. 1618-80), English adventurer, usually styled 'Colonel' Blood. His most notorious exploits were the plot to surprise Dublin Castle and seize the lord-lieuten-

ant, in 1663; the rescue of his friend Captain Mason from a guard of eight troopers near Doncaster; the attempt to abduct and hang the Duke of Ormonde, in 1670; and the theft of the crown jewels. Consult Abbott's *Col. Thomas Blood* (1911).

**Blood Feud**, the right of private vengeance. In primitive society the protection and enforcement of one's rights are largely left to the individual or to the family or clan to which he belongs, and the first step toward the reign of law consists in the legal regulation of this self-help. See VENDETTA.

**Blood Flower**, a genus of Amaryllidaceae, mostly natives of South Africa, some of which are common in greenhouses. They take their name from the usual color of their flowers.

**Bloodhound**, an ancient breed of dog, remarkable for its exquisite powers of scent, and for the eagerness with which it tracks a bleeding animal. The bloodhound was formerly common and much in use in Great Britain and on the continent of Europe for hunting purposes. Bloodhounds were also much used to track escaped prisoners and were resorted to by slave owners in America in the pursuit of fugitive slaves. The bloodhound is a large tan-colored dog, with a handsome and noble head expressing dignity and strength.

**Bloodletting**. See **Bleeding**.

**Blood Plasma**, the liquid portion of blood left after the red and white cells have been removed. Typed and treated to prevent coagulation, dried blood plasma was developed early in World War II and extensively used for emergency blood transfusions. A synthetic plasma called Dextrane was produced in Sweden in 1944.

**Blood Poisoning** is a name loosely used of septicaemia, pyaemia, and allied diseases. See SEPTICAEMIA; PYAEMIA.

**Blood Pressure**. The blood is under a certain degree of pressure which varies in different parts of the circulatory system. The heart propels the blood into the arteries. From the aorta, the main artery leaving the heart, branches go to all parts of the body. These branches break up into smaller and smaller divisions until they are of microscopic size, when they are called capillaries. These join one another to constitute a new system of vessels, the veins, which become progressively larger, and in them the blood is returned to the heart. The capillaries with their narrow lumina offer the maximal resistance to the flow of blood from the heart. As the result of these two forces, propulsion on the one hand, resistance on the other, the blood is under considerable

pressure. It is the arterial blood pressure that is ordinarily indicated when we speak of 'blood pressure.' After the blood has passed through the capillaries into the veins, the pressure, known as the venous pressure, is considerably lower.

The earliest blood pressure observations were made in 1733 by the Rev. Dr. Stephen Hale. Blood pressure is now measured with an instrument called the sphygmomanometer. In normal individuals, the blood pressure varies somewhat with age, increasing slightly with advancing years. The blood pressure is not constant in healthy individuals, but has a tendency to rise moderately with physical exercise or marked nervous tension, and to fall with rest or sleep.

**Blood Rain**, which doubtless has its origin in the uprushing currents of waterspouts and whirlwinds, has frequently fallen in Italy and Southern Europe, and has been repeatedly traced to microscopic dust, of a brick-red color, borne high into the air from the sandy deserts of North Africa adjoining.

**Bloodroot**, a perennial herb of the poppy family, native to Eastern North America, where it is found in colonies in rich, open woods on low, rocky hillsides. Both root stock and stem, when bruised, exude a blood red sap in copious quantities.

**Blood Stains** include both discolorations due to the contact of blood with an absorbent material, and the residue of blood left after evaporation on non-absorbent surfaces. The detection of blood stains is of the utmost importance in medico-legal investigations. The methods of determining the origin of suspected stains are of four types—chemical, spectroscopic, microscopic, and biological or serological. See BLOOD. Consult Sutherland's *Blood Stains*.

**Bloodstone**, **Heliotrope**, or **St. Stephen's Stone**, names given to a variety of chalcedony or plasma, distinguished by the presence on a dark green ground of blood red spots, apparently due to red oxide of iron. It is found in Iceland, the Hebrides, and in larger quantities in India and Australia.

**Blood Transfusion**. See **Transfusion**.

**Blood Vessels**, a general term applied to all the canals through which the blood circulates, including the arteries, veins, and capillaries. See ARTERY; BLOOD; CAPILLARIES; CIRCULATION OF THE BLOOD; VEINS.

**Bloodworms** are the aquatic larvæ of gnats, belonging to the genus of Chironomus.

**Bloody Assize**, name given to the treason trials conducted by Lord Chief Justice Jeffreys

of England after Monmouth's rebellion in 1685. See JEFFREYS OF WEM.

**Bloody Mary.** See Mary I.

**Bloomer, Amelia Jenks** (1818-94), American reformer, was born in Homer, N. Y. The particular costume for women associated with her name was first advocated by her in 1851.

**Bloomer Costume.** See Bloomer, A. J.

**Bloomery, Bloomary,** the first forge through which iron passes after it has been melted from the ore, and where it is made into blooms. See IRON.

**Bloomfield,** town, New Jersey, Essex co.; n.w. of New York. It is the seat of the German Theological Seminary, and Jarvie Memorial Library. Settled between 1670 and 1675, Bloomfield was a part of Newark until its incorporation as a township in 1812; p. 49,307.

**Bloomfield, Maurice** (1855-1928), American philologist and Orientalist, was born in Biclitz, Austria, and was brought as a child to the United States. He was professor of Sanskrit and comparative philology at Johns Hopkins. Professor Bloomfield's translations and editions of Sanskrit writings and his contributions to philological literature are numerous and important. Among his works are *The Atharva Veda* (1899); *Rig - Veda Repetitions* (2 vols., 1916).

**Bloomfield, Robert** (1766-1823), English poet, was born in Suffolk. In 1786 he conceived the idea of his poem *The Farmer's Boy*, which was so successful that nearly 26,000 copies were sold in three years.

**Bloomfield-Zeissler, Fanny** (1863-1927), American pianist, was born in Biclitz, Austria, and was brought in infancy to the United States, where she made her home in Chicago. She played in all the principal American cities, and toured in Germany, England, Austria, and France.

**Bloomington,** city, Illinois, county seat of McLean co. The Illinois Wesleyan University is situated here, and the State Normal University is two m. away. The town was settled in 1831; p. 34,163.

**Bloomington,** city, Indiana, county seat of Monroe co.; the seat of Indiana University; p. 28,163.

**Bloomsburg,** town, Pennsylvania, county seat of Columbia co., the seat of the Bloomsburg State Normal School. It is located in a rich coal and iron district; p. 10,633.

**Blossom, Henry Martyn, Jr.** (1866-1919), American writer, was born in St. Louis, Mo. He is the author of several novels and of the following plays and musical comedies: *Check-*

*ers; The Yankee Consul; Mlle. Modiste; The Prima Donna; The Only Girl; The Princess Pat; Eileen.*

**Blouet, Paul.** See Max O'Rell.

**Blount, William** (1749-1800); American public official, was born in Bertie co., N. C. He served as a delegate to the Continental Congress in 1783-4 and 1786-7, and as a member of the convention which framed the Federal Constitution in 1787. In 1790 he became governor of 'The Territory of the United States South of the Ohio,' and upon the admission of Tennessee to the Union was elected U. S. Senator.

**Blouse,** primarily a loose, sack-like outer garment such as is worn by the French workman, the Russian peasant, and the British farm laborer, by an extension of meaning any loosely fitting upper garment, as a shirtwaist or middie-blouse.

**Blow, Susan Elizabeth** (1843-1916), American educator, was born in St. Louis, Mo. She went to Germany and studied the kindergartens there, and returned to the United States a staunch disciple of Froebel. The kindergarten school she started in St. Louis in 1873 was markedly successful, and the training school later organized under her direction became the center of influence in the new movement. She published: *Symbolic Education* (1894); *Educational Issues in the Kindergarten* (1908).

**Blow-fly.** See Blue-bottle.

**Blowgun,** a weapon employed by certain tribes of North American Indians, consisting of a long hollow tube of cane or wood from which slender darts are expelled by blowing with the mouth.

**Blowing Machines,** mechanical contrivances for the production of a current of compressed air. Their use is as varied as their form, but they are chiefly employed to produce the blast for metallurgical and forced draught for boiler furnaces, to displace vitiated air in close and foul places, to supply warmed, cooled, or purified air to public buildings, and to furnish a drying current of air to lumber, grain, fabrics, brick and other articles, or to remove steam, dust, and refuse from factories. The most elementary blowing machine is the common bellows of domestic use, which was also used from time immemorial for metallurgy, until the blowing cylinder with reciprocating piston was devised. Blowing cylinders worked by direct-acting steam-engines are now in general use to produce a blast in furnaces. Blowing engines, as they are called, pump large quantities of air against comparatively low

pressures. For low pressures and large volumes of air, fans and rotary blowers are preferred.

The centrifugal fan or fan blower, as an apparatus for producing draft for ventilation, dates back to the 16th century, but the application of the fan to accelerate combustion is much more recent. Two types of fans exist: The first, known as the disc or propeller wheel, is constructed on the order of the screw pro-

the action of the wheel the air is drawn in axially at the center and delivered from the tips in a tangential direction. This type is designated as a centrifugal fan, or, more properly, as a peripheral discharge fan.

Fans are known as blowers or exhausters, owing to the duty which they perform. The normal use of a blower being to force air into a given space while the exhauster is employed to remove air from an enclosure. For conveni-

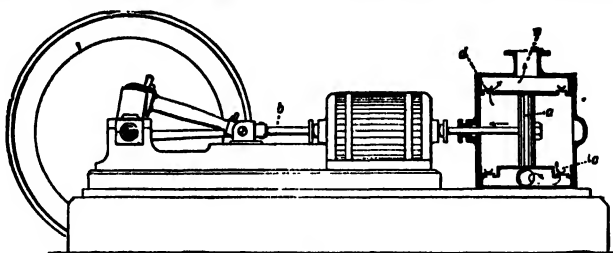


Fig. 1

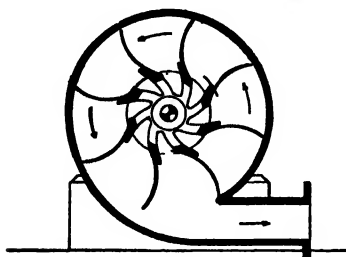


Fig. 2

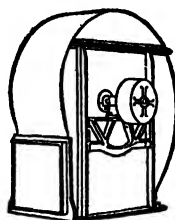


Fig. 3

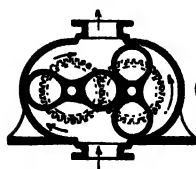


Fig. 4

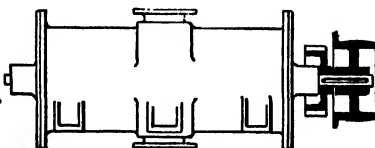


Fig. 5

#### Blowing Machines.

Fig. 1. Blowing cylinder: *a*. piston; *b*. piston rod of steam engine; *c*, air inlet valve; *d*. outlet valve; *e*. blast main. Fig. 2. Centrifugal fan, side elevation (section). Fig. 3. Elevation of bottom horizontal discharge centrifugal fan. Fig. 4. Roots' rotary blower (section). Fig. 5. Roots' rotary blower, elevation.

peller and moves the air in lines parallel to its axis, the blades acting upon the principle of the inclined plane. The second, or fan blower proper, consists in its simplest form of a number of blades extending radially from the axis and presenting practically flat surfaces. By

ence of adjustment of pipe connections an exhauster is provided with an inlet on one side only, while a blower being exempt from these requirements is provided with two inlets, one upon either side.

Blowitz, Henri Georges Stephen Adolphe

**Oppér de** (1825-1903), who won a European reputation as Paris correspondent of the *Times* during a period of thirty years, was born at the chateau of Blowsky, in Bohemia, and baptized a Catholic. He was at first a teacher, but later took to politics. During his connection with the *Times* he interviewed Bismarck, King Humbert, Pope Leo XIII., the Sultan of Turkey, and the Shah of Persia, among many notabilities. His *Memoirs* were published in 1903.

**Blowpipe**, an instrument used by glass-blowers, in analytical chemistry, and in the soldering of metals, for directing and increasing the rapidity of combustion of a flame. In its simplest form it consists of a tapered metal tube fitted with a mouthpiece; from the side projects a narrow tube provided with a nozzle of brass or platinum. Consult Rogers, Frances, and Beard, Alice, *5000 Years of Glass* (new ed. 1948); Kraus, F. H., and others, *Mineralogy* (4th ed. 1951).

**Blücher, Gebhard Leberecht von** (1742-1819), field-marshal of Prussia, was born at Rostock, and entered first the Swedish service, then the Prussian (1760). In 1813 Blücher received the chief command in Silesia, operating against the French at the battles of Lutzen, Bautzen, and Haynau. He defeated Marshal Macdonald at the Katzbach in Aug., 1813, Marmont at Möckern, Oct. 16, and three days later made his victorious entry into Leipzig and was raised to the rank of field-marshal. He was made Prince of Wahlstadt by Frederick William III. for his victory at Katzbach. After Napoleon's return from Elba in 1815 Blücher was appointed commander-in-chief of the Prussian army. At Ligny, on June 16, he was defeated after a stubborn action; but he rallied his scattered troops, and moved to the assistance of Wellington at Waterloo. In Blücher's honor Frederick William III. created the order of the Iron Cross; and Rauch's noble statue of the veteran was erected, 1820 at Breslau. See *Lives*, by Förster (1821; new ed. 1887), Scherr (1865), also the various histories of the Waterloo campaign, and Chesney, *Waterloo Lectures* (1874).

**Blue**. The blue pigments and dyes in most general use are ultramarine, cobalt blue, indigo, and Prussian blue, in addition to the large number of compounds made from coal-tar products.

**Blueback**, the salmon of the Fraser River and its neighborhood, one of the most valuable of the Pacific salmon. Its upper part is in spring distinctly bluish.

**Bluebeard**, a hero of the fairy tale, and

type of savage husbands. See Wilson's *Bluebeard: A Contribution to History and Folklore* (1899).

**Bluebell**, a name applied to various plants—the wild hyacinth which flowers in European woods in spring; to the several species of *Campanula* having nodding flowers, and particularly to the harebell, which flowers during summer on hills. The latter is the 'bluebell of Scotland.'

**Bluebird**, a common North American bird belonging to the thrush family, and beloved of every one as a 'harbinger of spring.' It is prevailing sky-blue above, with a brownish breast; but in western species the breast is white. See John Burrough's *Wake Robin* (1871).

**Blue Books**, official reports of the British Parliament and the Privy Council, usually bound in blue paper covers. The printing of the proceedings of the house dates from 1681. In France, the corresponding color is yellow; in Spain and Austria, red; in Italy, green; and in the United States both blue and red.

**Blue-bottle**, **Blow-fly** or **Flesh-fly**, an insect nearly related to the common house fly, but differing in its larger size, its bright blue abdomen, and its deep humming note. See Osborn's *Insects Affecting Domestic Animals* (1896).

**Blue-coat School**. See Christ's Hospital.

**Bluefields**, or **Blewfields**, river and town, Nicaragua, Central America. The river has a course of about 100 m., and is navigable for 60 m. The harbor of Bluefields is one of the finest in Central America; p. about 5,000.

**Blue-fish**, also called 'skip-jack,' is a widely-distributed fish belonging to the family of the horse-mackerels. It is especially common on the coasts of North America, where it is much used as food.

**Blue-gowns**, or **King's Bedesmen**, public almsmen in Scotland to whom the kings distributed bounty, in return for which they were expected to pray for the welfare of king and state.

**Blue Grass**. Certain species of the genus of grasses *Poa*, having bluish-green foliage, and panicles of bloom.

**Blue Laws**, any laws, especially sumptuary, characterized by extreme rigor and severity; particularly, in popular usage, the laws which were supposed to have been in force in the colony of New Haven, a collection of which was published by Samuel Peters in his *General History of Connecticut* (1781).

**Blue Sky Laws** were laws enacted in Kansas and later by other states to regulate the sale of stocks and bonds by corporations, etc., to



the public to prevent fraud.

**Blue Mountains.** (1.) Well-wooded range in New South Wales. (2.) Mountain group in Oregon, in the eastern part of the state; altitude from 5,000 to 9,000 ft. (3.) Mountain range in e. of Jamaica, running from e. to w. and culminating at 7,423 ft. (4.) Blue Mts., Pa. See also KITTATINNY.

**Blue Mountain Lake,** a lake at the foot of Blue Mt., an Adirondack peak of Hamilton co., N. Y.; p. 275.

**Blue Nile.** See Nile.

**Blue Peter,** a blue flag with white square in the center, denoting the letter P in the international signal code; hoisted to show that a ship is about to put to sea.

**Blue Pill,** contains free mercury in the proportion of one part in three with liquorice and confection of roses. It is a common purgative.

**Blue Ridge,** a range of the Appalachian Mountains, lying nearest to the Atlantic coast.

**Blue Shark,** a common shark, which sometimes reaches a length of 25 ft., though from 12 to 15 ft. is the usual size. Most abundant in tropical seas, its range extends northwards into the North Atlantic.

**Bluestocking,** a term applied contemptuously to a female pedant.

**Bluethroat,** a beautiful bird allied to the redstart, also called 'Swedish nightingale' and 'bluebreast'; which breeds in Northern Europe, Siberia, Alaska, etc., winters in Abyssinia and India, and is seen in Europe in spring and fall.

**Blum, Léon** (1872-1950), French socialist and political leader, gained publicity for his activities in the Dreyfus case. He was Prime Minister (1936-37); was imprisoned in a German concentration camp in World War II. In 1946, ambassador extraordinary to foreign countries; sought foreign loans. In the same year, as Premier-President he formed an interim cabinet, but resigned in January, 1947.

**Blum, Robert** (1807-48), German politician, born at Cologne. He helped to found, 1840, at Leipzig the *Schiller Society*, and, 1847, a publishing house from which he issued his *Staatslexikon*.

**Blum, Robert Frederick** (1857-1903), American painter, was born in Cincinnati, Ohio. His mural decorations of Mendelssohn Hall, New York, were his principal achievement in decorative work.

**Blumenbach, Johann Friedrich** (1752-1840), German naturalist, born at Gotha. In 1785, before Cuvier, he discerned that the true basis of zoological study is comparative anatomy.

**Blumenthal, Leonhard, Count von** (1810-

1900), Prussian general. As chief of the staff to the Crown Prince Frederick, he took part in the surrender at Sedan and in the siege of Paris.

**Blumenthal, Oskar** (1852-1917), German dramatist and manager of the Lessing Theatre, 1888-97, in Berlin, and author of a number of light and popular comedies, such as *Der Probepfeil* (1882), and *Aus heiterm Himmel* (1882).

**Blunderbuss,** a short obsolete gun, unrifled, and with a large bore, widening towards the muzzle, firing many balls or slugs, which scatter when fired, and can do execution within a limited range without exact aim being taken.

**Blunt, James G.** (1826-81), American soldier, born in Hancock co., Me. He served in the Federal army, rising to the rank of major-general of volunteers and was conspicuous in the border warfare of Kansas and Missouri.

**Bluntschli, Johann Kaspar** (1808-81), Swiss jurist, born at Zurich. From 1861 professor at Heidelberg, and at the front of liberal movements, he cooperated in the foundation of the German House of Representatives, 1862, and induced, 1865, the upper house to voluntarily submit to reform. No less zealous for religious freedom, he was one of the most active members of the German Protestant Union.

**Blushing** is a reflex dilation of the blood-vessels of the face and neck, due to vasomotor paralysis through the cervical sympathetic nerve, acted upon by the higher cerebral nerve centers, their action being initiated by the emotions of shame, bashfulness, timidity, and the like. See Darwin's *Expressions of Emotions in Man and Animals* (1872).

**B'nai B'rith**, (Sons of the Covenant) Order of. Oldest and largest of Jewish fraternal organizations, founded in New York in 1843, with the object of promoting a high morality. Grand lodges now exist in several European countries.

**Boa,** a genus of very large snakes, confined to tropical America, and without poison fangs. Their great size, 10 to 11 ft., and strength enable them to crush their prey to death by coiling the pliant body round the victim.

**Boabdil**, more correctly Abu Abdallah, last Moorish king of Granada.

**Boadicea**, queen of the Icenii in Britain, who inhabited Suffolk and Norfolk. The outrages of the Romans, 60 A.D., caused her to head an insurrection. She succeeded so far as to capture the towns of Camulodunum and Londinium, killing 70,000 Romans and their allies. But Suetonius later defeated the

Britons with great slaughter, and the queen put an end to her life, 62 A.D. This victory secured the Roman dominion in Britain. See Tennyson's *Boadicea*, and Cowper's ode with the same title.

**Boanerges**, a name given by Jesus to the disciples James and John, and interpreted by the sacred writer as 'sons of thunder;' hence sometimes applied to a man of strong and vehement character.

**Boar**, or **Wild Boar**, a mammal still found in many parts of Europe, Asia Minor, India, and North Africa. It is believed to be the original of the domestic pig, from which it differs in certain minor points. Zoologically the boar is of great interest, as being one of the most generalized of living even-toed ungulates, and as retaining the marshy habitat of the ancestral ungulates. It is the object of India's foremost sport, 'pig-sticking,' the chase of boars on horseback, and spearing them as they run. See also **PIG**.

**Boarding-House**. A private house maintained for furnishing table-board, usually with lodging. See **INN**.

**Boardman, George Dana** (1828-1903), Am. clergyman, born at Tavoy, Burma; worked for international arbitration. Wrote *The Creative Work* (1878); *The Divine Man* (1889), etc.

**Board of Trade and Plantations**. An English governmental board, established in 1696 to exercise general jurisdiction over colonial affairs, examine and pass on colonial laws, and suggest colonial legislation.

**Board of War**, the name of two boards, or committees, appointed by the Continental Congress during the American Revolution to look after the raising and equipping of troops.

**Boar-fish**, a name applied to two distinct fish—(1) an Australian food-fish belonging to the perch family, and (2) one of the Mediterranean horse-mackerels.

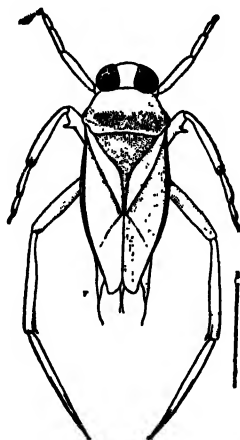
**Boas, Franz** (1858-1942), Am. anthropologist, b. Minden, Ger.; carried on scientific exploration in many places; prof. of anthropology, Columbia Univ., 1899-1942. Wrote numerous books on anthropology.

**Boat**, a term now indiscriminately used for sea and river vessels of all kinds, but more properly applied to a vessel that can be hauled up on or launched from a beach. It may be propelled by oars, sails, steam, or other motive power. From the earliest ages men have used buoyant contrivances to float them across streams and lakes. The primitive log or number of logs lashed together to form a raft, or bundles of brushwood or reeds used for the

same purpose, early developed into the parent of modern boats, the dug-out, which has been found in association with Stone Age remains and in Swiss lake dwellings. See **LIFE-SAVING APPARATUS**.

**Boatbill**, a South American night-heron, remarkable for its broad head ending in the peculiar flattened and keeled bill to which it owes its name. See **HERON**.

**Boat-fly**, or **Water-boatman**, a carnivorous bug living entirely in the water. It is peculiar in that it always swims back downwards, and is exceedingly common in ponds, where it may be seen rising to the surface to breathe.



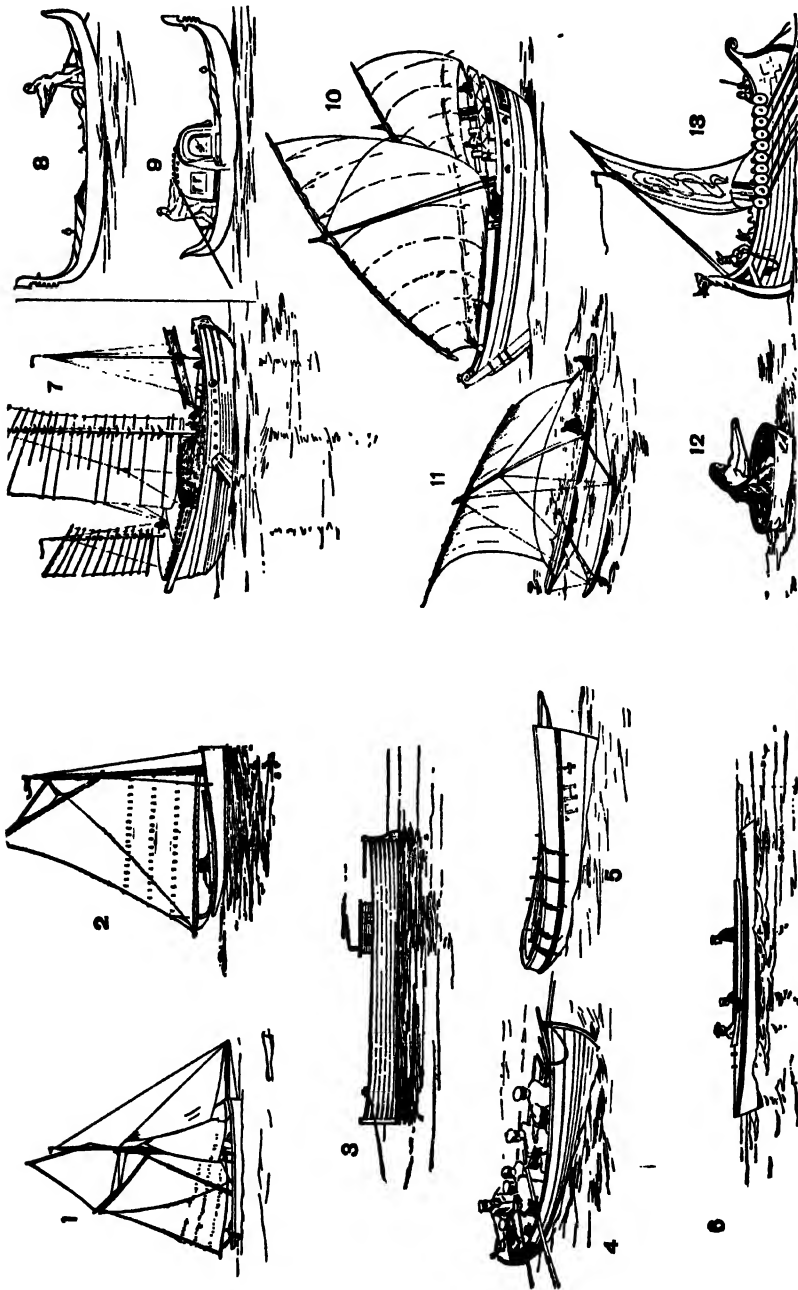
*Boat-fly, or Water-boatman.*

**Boat Race**. See **Rowing**.

**Boatswain**, a warrant-officer in the U. S. navy. The term is derived from 'boat's swain,' or husband. A boatswain has charge, under the supervision of the executive officer, of the rigging, anchors, cables, boats, and other equipment. Assisted by his mates, he summons the crew at all general drills and evolutions and acts as assistant to the executive officer in carrying on the work of the ship.

**Bobadilla, Francisco de** (?-1502), Spanish magistrate in Hispaniola, or Santo Domingo, a knight commander of the Order of Calatrava. In 1500 he was sent to Hispaniola. After a short period of mismanagement, Bobadilla lost his life at sea (probably in July, 1502), while being sent back to Spain.

**Bobbins**, wooden rollers with axial perforation by which to place them on a spindle, and flanged at each end. It is on bobbins that yarn is wound. Paper tubes are now largely taking the place of bobbins.



*Types of Boats Belonging to Various Times and Places.*

1, Cutter. 2, Canal boat. 3, Catboat. 4, Whale boat. 5, East coast coble (British). 6, Motorboat. 7, Chinese junk. 8, 9, Venetian gondolas. 10, Slave dhow. 11, Malay proa. 12, Viking boat. 13, Viking boat.

**Bobcat.** The name of the smaller and more southerly species or varieties of the North American lynx.

**Bobolink,** or **Rice-bunting,** a North American bird, famous for its song, powers of flight, and especially for the flavor of its flesh.

**Bobwhite.** A sportsman's name, taken from its cry, of the quail or partridge of the Eastern United States.

**Boccaccio, Giovanni** (1313-75), great Italian writer and humanist, was born at Paris, the natural son of a Florentine merchant. In 1334 he fell in love with Maria d'Aquino, a natural daughter of King Robert of Naples. This passion directly or indirectly inspired the poet to the composition of a number of works—the *Rime*, *Filocolo*, *Filostrato*, *Teseide*, *Amorosa Visione*, and *Fiammetta*. While living in Florence he formed a



*Bobolink.*

close friendship with Petrarch who endeavored to work on Boccaccio's religious feelings, and later a priest, Gioacchino Ciani, effected a complete change in his moral views and conduct. The *Decamerone*, the book on which rests Boccaccio's chief claim to immortality, describes how, while the plague is raging at

Florence in 1348, seven maidens, and three youths of noble birth repair to a villa near the city, and, to while away the time, tell each a tale on ten successive days, making one hundred stories in all. The tales go back to the most various sources—Eastern, classical and French stories, contemporary events, anecdotes, and scandals. Though the majority of the themes are undoubtedly immoral, Boccaccio's treatment is never obscene. The novel becomes in his hands a vehicle for dramatic development and psychological analysis; and many are the great writers who have borrowed from him—Chaucer, Shakespeare, Dryden, and others.

For a full account of all the editions, see J. A. Symonds, *Boccaccio as Man and Author* (London, 1895); and W. P. Ker, *Boccaccio* (Oxford, 1900).

**Boccherini, Luigi** (1743-1805), Italian musical composer and 'cellist, born at Lucca; spent the greater part of his life at Madrid as court composer. Of his vocal works, only the *Stabat Mater* is published.

**Bodanzky, Artur** (1877-1939), Viennese musician and orchestral director who became associated with the Metropolitan Opera Company in 1915 and in that capacity became the foremost conductor of Wagnerian opera in the United States.

**Bodleian Library,** Oxford, named after Sir Thomas Bodley, who, after the complete destruction, before 1556, of the university library of Oxford, restored it, 1598, by a gift of books collected by himself at a cost of £10,000. Later contributors include the Earl of Pembroke, General Fairfax, Edward Malone, and many others. The library now has over half a million volumes. It is entitled to a copy of every book printed in the United Kingdom.

**Bodley, Sir Thomas** (1545-1613), English diplomatist and scholar; began his diplomatic career with a mission to Denmark; became the queen's representative in the United Provinces, but devoted the major part of his life to the foundation and development of the Bodleian Library at Oxford.

**Bodmer, Johann Jakob** (1698-1783), one of the chief pioneers in the regeneration of German literature in the 18th century.

**Body of Liberties,** a code of laws and 'bill of rights,' drafted by Rev. Nathaniel Ward, and adopted in December, 1641, by the General Court of the colony of Mass.; much of it was subsequently embodied in the formal laws of the colony, and it was thus

the foundation of the Mass. legal code. The text of the Body of Liberties may be found in MacDonald's *Select Charters and Other Documents illustrative of American History*, 1606-1775 (1899).

**Body-Snatching.** The criminal offence of taking and carrying away a dead human body without authority from those having the legal custody thereof. Such an offense is a misdemeanor, punishable by fine or imprisonment.

**Boehler, Peter** (1712-75), Moravian bishop, was born in Frankfurt-on-the-Main, Germany; was sent as a missionary to the negro population of Carolina and Georgia, 1737, and meeting with the Wesleys in England on his way, is recorded as having been the instrument for converting John Wesley; established the Moravian settlement at Bethlehem. See Lockwood's *Life* (1868).

**Boehm, Sir Joseph Edgar** (1834-90), British sculptor, born in Vienna. His chief works are: Statue of Queen Victoria (1869) in Windsor Castle, and the Stanley Sarcophagus in Westminster Abbey. Boehm was appointed sculptor-in-ordinary to Queen Victoria (1881), and created baronet (1889).

**Boehme, or Boehm** (called also in England BEHMEN), **Jakob** (1575-1624), German philosopher and mystic, was born at Altseidenberg, near the town of Görlitz. For Boehme, God is the One from whom all creation proceeds by His self-differentiation into a negation of Himself. Spirit cannot be, except it distinguishes that which is not itself; and this inner difference, beginning in God, and reproducing itself in all consciousness, is the principle by which the whole world is evolved. Boehm's collected works were published in Amsterdam in 1675, and again in 1730, and in Leipzig in 1831-46.

**Boeotia**, a district of ancient Greece, bounded on the east by the Eubæan Sea; south by Attica, Megaris, and the Corinthian Gulf. In the earliest times Boeotia was occupied by a race called the Minyæ. The Boeotian cities were united in a league, and the history of Boeotia turns chiefly on the attempts made by Thebes to dominate this league. See W Rhys Robert's *The Ancient Boeotians* (1895).

**Boers** (Dut. *boer*, a 'peasant or husbandman'); the farmers in South Africa descended from the Dutch who founded Cape Colony in 1650. See TRANSVAAL, SOUTH AFRICA.

**Boer Wars.** See South Africa.

**Boethius, or Boetius** (c. 470-524); Roman statesman and philosopher. His full name

was ANICIUS MANLIUS SEVERINUS BOETIUS. He was consul in 510, also chief of the senate. Theodoric, king of the Ostrogoths, made him one of his most powerful ministers. But his protests against the excesses committed by the Gothic officers, brought him into disfavor with Theodoric. He was accused of treason, sentenced to death untried, and imprisoned in the tower of Pavia, where he produced his great work, the *Consolation of Philosophy*. He was executed in 525.

**Bog** is spongy land containing considerable accumulations of decayed or decaying vegetable matter (peat). Bogs are most abundant in flat-lying countries, high latitudes, and near the sea, as high rainfall, cold climate, and insufficient evaporation favor their formation. See PEAT; BOG PLANTS; CHAT Moss.

**Bogardus, James** (1800-74), American inventor, was born in Catskill, N. Y. Of his inventions the best known are the ring flyer for spinning cotton, and instruments used in rubber manufacture and in deep-sea sounding. In 1839 he gained the prize offered by the British government for the best machine for the manufacture of postage stamps.

**Bogert, George H.** (1864-1944), Am. artist; obtained (1899) the Hallgarten prize at the National Academy of Design, and the bronze medal, Paris Exposition, 1900.

**Boggs, Frank Myers** (1855-1926), American artist. His *Place de la Bastille* is in the Luxembourg Museum, and (1883) *Isigny* in the Niort Museum, France. *A Rough Day, Honeysuckle*, is in the Boston Museum.

**Boghaz-Keui, or Boghaz-Koi** (ancient *Pteria*), village, province of Angora, Asia Minor. Has remains of an extensive ruined city, a great centre of Hittite civilization.

**Bogie**, the small truck forming the front part of a locomotive engine.

**Bog Iron Ore**, a spongy and porous form of limonite found in meadows and bogs.

**Bog Oak**, portions of oak trees frequently found in peat bogs, showing that a forest formerly grew where mosses and other marshy plants which form peat have supervened.

**Bogomiles, or Bogomili** (from Slavonic words meaning 'friends of God'), a religious sect of the 12th century, whose chief seats were in Thrace, Macedonia, and Bulgaria. It survived until the Turkish conquest.

**Bogomoletz, Alexander A.** (1881-1946), Russ. scientist; director of Kiev's Institute for Experimental Biology and Pathology; decorated, 1944, for work on a life-preserving anti-reticular-cytotoxic serum.

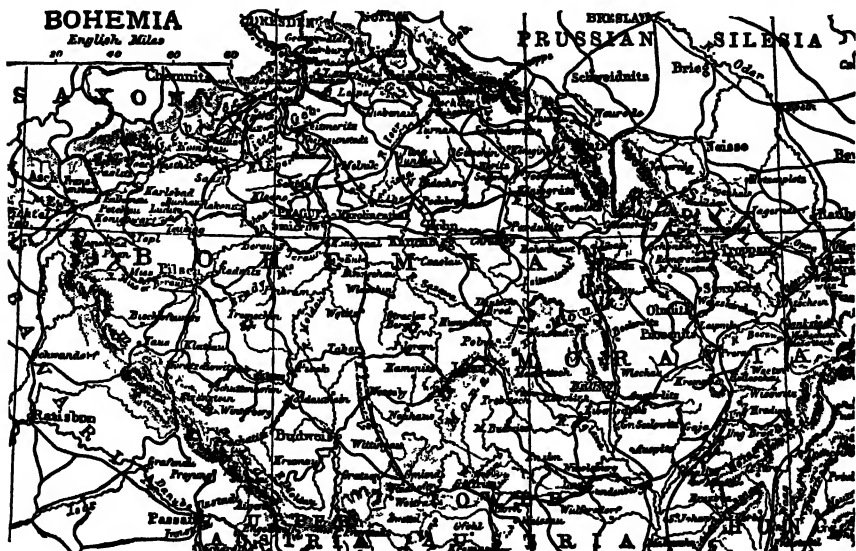
**Bogotá**, or **Santa Fé de Bogotá**, the capital of the republic of Colombia, in the department of Cundinamarca. The city is noted for its culture and education, its institutions, including the University of Bogotá, National Academy, National Museum, three state endowed colleges, National Library (50,000 volumes), National Observatory, School of Chemistry and Mineralogy, and Botanical Gardens, old San Carlos Palace, the residence of the president of the republic, and the Mint. Rich mineral deposits occur in the district on the north and east, including iron, coal, salt, limestone, fire clay, manganese, and precious stones. The principal manufactures are tex-

arising from a distention of the joint capsule with synovial fluid. See *HORSE, Diseases*.

**Bohain**, town, department Aisne, France; during the World War (1914-19) it was occupied by the Germans, who used it as a centre for detaining troops and stores; p. 5,833.

**Bohemia** (Bohemian *Chehky* or *Cechy*; German *Böhmen*), formerly a kingdom of the Austrian Empire, forming 1918-1939, and after 1945 part of the Czechoslovak Republic. It is bounded by Saxony on the north, Bavaria on the west, Silesia on the n.e., Moravia on the e., and Upper Austria on the s. Its area is about 20,065 sq.m.

With a fertile soil, an industrious popula-



tiles, pottery, glass, cordage, matches, brewing, flour, and shoes. There are large electric lighting plants and electric railways; p. 642,000.

**Bog Plants.** The areas of the Northern Hemisphere, which are covered by bogs and marshes have a highly characteristic flora that is distinct from the fully aquatic plants and from the ordinary terrestrial flora. Most important and widely distributed of bog plants are bog mosses (see *SPHAGNUM*); higher cryptogamic plants also occur, notably horsetails (see *EQUISETUM*). The bog myrtle often overspreads vast areas with its low, scanty brushwood. The insectivorous plants are perhaps the most characteristic minor denizens.

**Bog Spavin**, a fluctuating swelling on the inner and front part of the hock of a horse,

and abundant mineral deposits, Bohemia's resources are extensive. Forests cover 29 per cent. of the surface; the remainder is under cultivation or under grass. Cereals thrive in the lower districts, potatoes and oats in the higher grounds. Beet root is extensively grown for sugar. Cattle raising and in the South geese are important sources of wealth. The most important minerals are coal and lignite, silver, iron, and graphite. The most important industry is sugar manufacturing; cloth, cotton goods, carpets and linens are manufactured. About 200,000,000 gallons of beer are brewed annually. The glass trade has been in a flourishing condition since its introduction from Venice in the 13th century, Bohemia glass being universally known for its beauty.

The Bohemians, or Czechs (*Chehks*), are



mostly of Slav stock, and have been settled in the country since the 5th century. About 37 per cent. of the population is of German descent. The latest figures taken show it has a population of 6,977,000. The capital is Prague, the seat of the oldest of the German

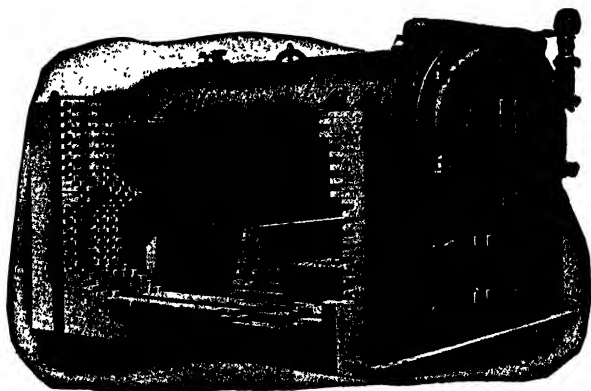
universities, founded in 1348. Other large towns are Pilsen, Budweis, and Aussig.

When Bohemia is first mentioned in history we find it occupied by the Boii, a Celtic tribe; hence the name Böhmen (German *heim*, or home, of the Boii). The Boii were expelled

by the Germanic Marcomanni in the beginning of the Christian era. From 1310 to 1437 the country was ruled by Kings of the House of Luxemburg. The reign of Charles iv. was marked by the founding of the University of Prague. Charles was followed by Wenceslaus iv. (1378-1419), whose reign was noted for a religious movement led by John Huss, which strongly leavened with nationalist aspirations, resulted in the Hussite War (See HUSSITES, WAR OF), and continued to agitate the country for nearly a hundred years. In 1458 George Podiebrad was unanimously chosen king by the Bohemian Estates. He was regarded with the greatest abhorrence by Pope Paul II.; and was engaged in continuous fighting with Matthais Corvinus, the vigorous king of Hungary, whom he succeeded in driving completely out of Moravia. His suc-

climax. The reluctance of the Bohemians to fight for the Central Powers led to serious repressive measures, and on Oct. 28, 1918, revolutionists seized Prague. Meantime Czech and Slovak emigrants had organized a Provisional Government abroad, and Bohemia became part of the new Czechoslovak State (See CZECHOSLOVAK REPUBLIC). Upon the extinguishment of Czechoslovakia by Hitler's coupe, 1939, Bohemia was held by Germany until 1945. Consult Monroe's *Bohemia and the Czechs* (1910); Capek's *Bohemia under Hapsburg Misrule* (1915).

**Bohemia: Language and Literature.**—The Bohemian language belongs to the western branch of the Slavonic languages, and is closely connected with Slovakish, which is spoken in the northern parts of Hungary. Bohemian literature may be divided into three



*Bigelow Horizontal Return-Tubular Boiler.*

cessor, the Polish prince Ladislaus (1471-1516), was elected (1490) to the throne of Hungary, and removed the royal residence to Ofen, where his son and successor, Louis (1516-26), also resided. After the death of the latter in the battle against the Turks, led by Sultan Solymán at Mohacz, Bohemia and Hungary passed into the hands of Ferdinand I. of Austria, who had married Louis' sister.

From this time forward the history of Bohemia merges in that of Austria. Revolutionary movements agitated the country in 1848; and the ensuing years were marked by increasing rivalry between the Czechs and Germans and by almost continuous agitation by the young Czech party for political autonomy. World War I brought these dissensions to a

leading periods—(1) from the beginning till the Hussite wars (1410); (2) from the time of Huss to the latter part of the 18th century; (3) from the renaissance of the literature to the present day. The earliest productions are religious in character.

The second period begins with the name of Huss, who did a great deal to settle Bohemian orthography, and to develop Czech literature. It was not until nearly the close of the 18th century that a revival of Bohemian literature took place. In our own days Bohemian literature has been greatly developed. Among the most celebrated poets are Jan Vrchlický (1853-1912), a voluminous writer; Sladek (1845-1912), Halek (1835-74), Zeyer (1841-1901), Svatopluk Cech (1846-1908), one of



the greatest modern epic poets; Frantisek Svoboda (1860); Bezruc (1867), and Brezina (1868-1929), the last being authors also of admirable works in prose.

The first to collect the folktales of the country was Bozena Nemcova (1820-62), while Schafarik (1795-1861) was the first to treat scientifically the ethnology of the Slavonic races. His book is familiar to most students in the German translation *Slawische Alterthumer* (1837). Other prose writers of note are Karolina Svetla (1830-99); Sezima (1876); Klostermann (1848-1923); Capek (1890-1938), and Srámek (1877).

**Bohemian Brethren.** See **Moravians.**

**Bohemian Forest** (Ger. *Böhmerwald*), a mountain range separating Bavaria from Bohemia, some 150 m., reaching its maximum elevation in Great Arber (4,785 ft.) and Rachel (4,770 ft.), though the average altitudes lie between 2,500 and 4,500 ft. With the exception of the highest summits, the range is covered with dense forest.

**Bohemond I.**, (c. 1056-1111), prince of Antioch, was the eldest son of Robert Guiscard (q.v.), under whom he served with distinction in the war (1081-5) against Alexius Comnenus, emperor of Byzantium. He took a distinguished part in the first crusade (1096), captured Antioch (1098), of which he became prince.

**Bohn, Henry George** (1796-1884), English publisher and author, was born in London. In 1841 he issued his famous 'guinea catalogue' of books, containing 23,208 items, and in 1846 he began the cheap issue of notable books with which his name is chiefly associated. Besides the *Origin and Progress of Printing* (1857), he published some of his own translations.

**Bohol**, island, of the Visayan group, Philippine Islands, lies between the southern end of Leyte and Cebu Islands. It is a coral island, about 55 m. long, by 30 m. wide, with an area of approximately 1,495 sq.m. Agriculture is the chief occupation, 175,000 acres of the great plateau of the interior being under cultivation. The principal products are rice, corn, sugar and copra; p. 358,387. See **PHILIPPINE ISLANDS.**

**Bohr, Niels** (1885- ), Danish scientist, was born in Copenhagen. In 1922 he received the Nobel Prize in physics for his theory of the structure of the atom (see **ATOM**). One of leaders in production of first atomic bomb. Author of *Atomic Theory* (1945).

**Böhtlingk, Otto** (1815-1904), Russian Sanskrit scholar, was born in St. Petersburg,

Russia. Among his works are the first European edition of the Indian grammarian Panini (1839); a Sanskrit Chrestomathy (1845; 2d ed. 1877); and a Sanskrit dictionary.

**Boil**, a circumscribed suppurative inflammation of the skin, or of subcutaneous connective tissue, or of a gland, with the formation of a core of dead tissue. It usually begins as a small hard point of a dusky red color, which is hot, painful, and throbbing. This point extends, and the symptoms increase in severity till sooner or later, when the boil ceases to enlarge, it is of a conical form, with a broad firm base, and on the apex a whitish blister, containing a little pus. This opens, and after a few days the core is discharged, and the small cavity heals, leaving a white depressed scar.

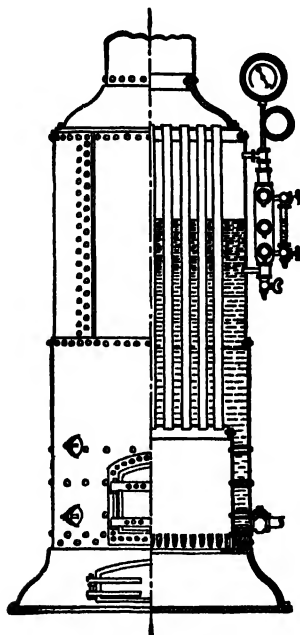
**Boileau-Despréaux, Nicolas** (1636-1711), French poet and critic, was born in Paris. He published his satirical *Adieux d'un Poète à la Ville de Paris* in 1660, and in 1663 he was united with Molière, La Fontaine, and Racine, in the famous 'society of four.' Boileau gained the favor of the king, who in 1677 appointed him, along with Racine, royal historiographer. Consult Fournier's edition of Boileau.

**Boiler.** A steam boiler is the combination of a furnace in which fuel is burned and a closed vessel in which steam is generated. The combustion of the fuel—solid, liquid, or gaseous—in the furnace produces hot gases that act as carriers of heat to the various parts of the heating surface through which the heat is transmitted to the water by conduction. Much of the heat absorbed by the water is transmitted by radiation from the incandescent fuel and the highly heated furnace walls to those parts of the heating surface directly surrounding the furnace. The heating surface comprises those portions of the boiler which are in contact with the hot gases on one side and with water on the other.

The most common type of boiler in use in the United States is the horizontal return-tubular boiler. Such a boiler consists of a cylindrical shell, with flat heads supported by stays and connected by a large number of tubes. The boiler is supported in a horizontal position by a brick setting, which also supports the grate under one end of the boiler. The gases of combustion are caused to travel along the under surface of the boiler over its entire length and then return through the internal tubes, escaping through a breeching placed vertically above the fire-door. In this way about one-half of the surface of the shell

and all of the tubes are useful in transmitting heat.

Vertical boilers may be of either the fire-tube or the water-tube type. The furnace is located inside the shell and is surrounded by water except at the bottom. The annular space between the walls of the furnace and the outside shell is known as the water leg. Tubes lead from the furnace vertically up-



*Courtesy of McGraw-Hill Book Co.*

**Vertical Fire-Tube Boiler.**

ward to the smoke-box and the hot gases produced by combustion rise through these tubes and escape from the smoke-box to the chimney. Heat is transmitted to the water by radiation to the furnace walls and by conduction through these walls and through the tubes. The steam space of this type of boiler surrounds the upper ends of the tubes. The parts of the tubes extending through the steam space form superheating surfaces. But if the boiler is steaming at a fair rate, the ebullition at the water surface is so violent that the steam filling the upper part of the shell is more or less wet. Consequently superheating does not occur, but the exposed tube ends dry out the wet steam.

A locomotive-type boiler consists of a rectangular fire-box attached to a cylindrical shell

called the barrel, which extends horizontally from the fire-box to the front part or smoke-box end of the boiler; the fire-box is connected to the smoke-box by a number of tubes, through which the products of combustion pass on their way to the chimney. The fire-box is enclosed completely within the body of the boiler; consequently the four sides, and also the top or crown, are available as heating surface, which is greatly augmented by the tubes traversing the water space in the barrel. The tubes, in addition to acting as flues and heating surface, fulfil also the function of stays to the flat end of the barrel of the boiler, and to the portion of the fire-box opposite to it.

In water-tube boilers the steam is generated from water contained in thin tubes of small diameter, by heat applied to the outside of the tubes. Circulation in water-tube boilers is mainly produced by the difference in density of the ascending and descending currents of water. In this type of boiler a small quantity of water covers a large area of heating surface, and a rapid circulation is necessary to carry off the heat absorbed by the generating tubes, which must be arranged to facilitate the free escape of the steam.

To eliminate the objectionable 'geysing,' especially on shipboard where boilers are usually forced to maximum capacity, the cross-drum boiler was developed by several firms. The longitudinal drum is here replaced by a cross-drum, usually 42 to 48 inches in diameter. The sinuous headers are retained, and each set is connected to the drum by tubes. As the headers connections enter along the entire length of the lower side of the drum, the disengaging surface is great.

When the tubes have a slope of over 45 degrees, it is usual to class them as being of the vertical type. There are then included in the vertical horizontal-drum class two distinct types, one a boiler made up of an upper and a lower drum placed with the cylinder axis horizontally connected together by straight tubes. As long as this type was used for medium capacities, the number of tubes possible to place in the drum shell was sufficient. But when capacities went over 24,000 lbs. per hour, it was necessary to employ three or more drums, which in turn forced the employment of tubes with ends bent to enter the drum radially.

In the inclined tube horizontal-drums water-tube boiler, the heating surface is almost wholly supplied by water tubes. The main tubes connect three steam drums above with

the water drum below. The sides and back and front of the boiler are composed of brickwork, in which suitable doors are provided for cleaning, etc. In addition to the main tubes there are short curved tubes, which connect the three steam drums with one another. Above the middle steam drum is a dome with an anti-priming pipe, through which the steam is taken from the boiler. There are no brickwork supports under the lower drum, which hangs from the upper drums by the tubes, so that the whole boiler is free to expand without disturbing the brickwork. The feed-water is introduced below the water level in the backmost top drum; it then finds its way down the bank of tubes to the lower water drum. The water then passes by means of the inclined tubes, to the upper drums. By means of suitable baffles, the furnace gases are compelled to pass up and down the various banks of tubes until they reach the flue.

The tubes are curved at their ends in order that they may enter the drums in a radial direction. This makes it a simple matter to expand the ends of the tubes tightly into the holes in the drums. There are two methods by which the efficiency of a power plant can be increased to any extent, either through an increase in boiler pressure or in the temperature of the steam. For metallurgical reasons a temperature of much over  $750^{\circ}$  F. is impractical, so there has been a steady increase in the boiler pressure. Consequently modern boiler designs jump from 450 lbs. to 1,200 lbs. pressure.

With the advent of high pressures and high rates of evaporation, there have been many cases of plate fracture in boilers, especially along the riveted point. Investigation has revealed that such trouble as has been experienced has occurred in boilers that used a zeolite feed water treatment; this is a caustic treatment, and it is claimed by many that the caustic soda has caused embrittlement. The metal fails due to progressive cracking, but the structure of the metal adjacent to the crack does not become any more brittle than it was before. The condition of the water or other corroding media in contact with the metal while under stress, however, does have a material effect upon the acceleration of the cracking. To this extent the idea of maintaining a non-destructive condition of boiler water has a sound basis. To what extent various waters accelerate corrosion fatigue, pitting and cracking under boiler conditions has not been adequately investigated.

Water when boiled produces saturated

steam, which has a definite temperature for each pressure. If steam is still further heated in the absence of water, its temperature may be raised above that of saturated steam for the same pressure, and it is then called superheated steam.

The advantages of superheated steam for use in steam engines or turbines arise from the facts that it carries no moisture in suspension, has a greater heat content for the same weight, permits the attainment of higher steam temperatures, and therefore higher engine efficiency without a correspondingly higher steam pressure, and if sufficiently superheated does not condense while doing work by expansion, as does ordinary steam.

Mechanical stokers are used mainly for three reasons: first, to reduce the cost of boiler-room attendance by reducing the number of men required; second, to insure a more uniform and economical firing; and, third, to secure more perfect combustion and decrease the amount of smoke. The first end is especially important in large boiler plants, but in small plants which could be tended by one man there is little or no saving.

Stokers by reason of their high cost are seldom used on small boilers. Of late, however, several stokers of low first cost have been designed for application to small boilers, especially of the heating type.

The idea of finely crushed coal so that upon introduction into the furnace it would burn as freely as natural gas, was proposed a hundred years ago. But the commercial application began as late as 1910. Since then the development of coal grinding and handling apparatus has been exclusive, and at present about one half of the power boilers installed each year is equipped for the burning of pulverized coal.

Two basic methods are used: The central pulverizing and the individual pulverizing systems. Until recently it was the practice to place the coal pulverizers in a building separate from the boiler house. The coal was ground and conveyed to a storage bin and was drawn and conveyed to each boiler. With this system the coal had to be thoroughly dried before storage to prevent clogging of conveyor screens; this was accomplished by separately fired rotary drums or by the boiler fuel gases. This system was expensive and entailed considerable extra labor.

At present the tendency is toward the use of individual grinders and blowers, as many as six being used on one boiler. The pulverizer is some type of paddle wheel revolving at

high speed, and by impact the coal is finely pulverized. A blower mounted on the same shaft as the paddle wheel blows the coal dust and part of the air supply through the burner nozzle. The remainder of the air is taken in through openings around the burner. If the coal is bituminous with the usual amount of moisture no drying is necessary. But lignite which may contain 40 per cent. of moisture usually necessitates some drying.

Every boiler should be provided with one or more safety valves. A safety valve should not permit the pressure of the steam in the boiler to rise above a fixed limit; and when the blowing-off pressure is reached, it should discharge steam so rapidly that little or no increase in the pressure of the steam can take place, however rapidly the steam may be generated. The standard form of safety valve is the spring-loaded safety valve. The lever safety valve is rapidly becoming obsolete.

A reliable gauge to indicate the steam pressure is also a necessary adjunct to a boiler; it should be removed from the boiler at regular intervals and tested, for gauges are liable to get out of order when in constant use, and to give inaccurate indications of pressure. A boiler should have a water gauge to show the height of the water at all times. It is also customary to provide gauge cocks, which are more dependable, although not so convenient as gauge glasses.

In the past the capacity of a boiler as a steam generator was commonly expressed in *boiler horsepower*, but that method has been replaced by the system of stating the square feet of heating surface the boiler possesses, and the total amount of steam the boiler will generate at a stated efficiency.

**Bibliography.**—Croft, T. W., ed., *Steam Boilers* (2nd ed. 1937); Spring, H. M., *The Boiler Operator's Guide* (1940); Higgins, Alex., *Boiler Room Questions and Answers* (1945); Darnell, J. R., *The Boiler Fireman's Handbook* (1947).

**Boiler Compositions, or Compounds.** The most objectionable impurities in water to be used for steam raising are the bicarbonates of calcium and magnesium, magnesium chloride, calcium sulphate, and, in sea water, common salt. When water containing the bicarbonates is boiled, carbon dioxide is evolved, and calcium and magnesium carbonates are precipitated. Calcium sulphate is probably the worst impurity.

In low-pressure boilers on board ship, salt water is sometimes used, but as it becomes concentrated the salt is deposited. With high-

pressure and tubular boilers salt water cannot be used, and a distilling apparatus or evaporator is necessary.

The bicarbonates are readily removed by heating the feed water, whereby they are deposited in the heater; or the water may be softened by the addition of lime. Caustic soda is often introduced into boilers; it combines with the carbonic acid of the bicarbonates, giving sodium carbonate, and precipitates the calcium and magnesium carbonates. The sodium carbonate then reacts on the calcium sulphate, forming sulphate of soda and carbonate of lime. If carbonates are not present in the water, washing soda may be used.

One of the most successful of anti-incrustators is tri-basic phosphate of soda. It precipitates the calcium and magnesium salts in the water as a slimy mud which does not stick to the plates.

Besides the above saline anti-incrustators, organic substances, such as fats and oils, tannin, and kerosene oil, are used; but with the exception of the last-named substance, which seems to act mechanically, such bodies should be regarded with suspicion.

**Boiling.** The act of boiling consists in the brisk transformation of a liquid into its vapor form. During the process the heat that is applied to produce the transformation is wholly used up in effecting the change, and the temperature of the liquid remains constant at what is called the *Boiling Point* (q.v.). For boiling of foods, see *COOKERY*.

**Boiling Point,** the temperature at which the vapor tension of any liquid equals the pressure of the surrounding atmosphere, causing boiling or ebullition. The boiling point of any liquid of definite constitution, therefore, will remain constant so long as the pressure does not vary, but will fall as the pressure is decreased, and rise as it is increased.

The relation of boiling point and pressure finds many practical applications, as in the use of vacuum pans in the manufacture of sugar (see *SUGAR*), and the preparation of chemical substances which would decompose at the normal boiling point of the mother liquor. Another important application is the hypsometric thermometer, which makes it possible with fair accuracy to determine the altitude of any given place by observing the temperature at which water boils (see *LEVELLING*).

When a liquid contains a solid in solution the boiling point is raised. Thus, it is necessary to raise brine to a higher temperature than 100° c. to make it boil. Furthermore,

the boiling point does not remain stationary, as in the case of a pure liquid, but rises as the steam passes off and the solution becomes more concentrated.

**Bois-Brûlés**, (also known as Half Breeds), a race of people in North America, the descendants of Canadian Frenchmen and Indian women.

**Boise**, capital and largest city of Idaho, and county seat of Ada co. A flourishing agricultural, horticultural, and stock-raising region lies about the city, and rich mines occur in the surrounding mountains. It is also one of the most important trade centres for wool in the United States; p. 34,393.

**Boise Project**, an undertaking authorized by the U. S. Government in 1902, to irrigate from the Boise River 353,941 acres nearly all in Idaho, in the counties of Ada, Boise, Canyon, and Elmore

**Boissier, Marie Louis Gaston** (1823-1908), French writer was born in Nîmes. His works, distinguished for clearness, vividness, accuracy, and charm of style, include: *Cicéron et ses amis* (1865; 12th ed. 1902); *L'Opinion sous les Césars* (1875; 4th ed. 1900); *La religion romaine d'Auguste aux Antonins* (1874; 5th ed. 1901); *Promenades archéologiques: Rome et Pompéi* (1880, 1896).

**Boissieu, Jean Jacques de** (1736-1810), French painter and engraver, was born in Lyons. His 140 etchings are regarded as the best work of the kind of that period. Among his paintings are: *Italian Landscape, with Women Washing* (Paris); *Hilly River Landscape* (Berlin).

**Boissonade, Jean François** (1774-1857), French classicist, was born in Paris. His more important works are: *Sylloge Poetarum Græcorum* (1826); and *Babrii Fabulæ* (1844).

**Boito, Arrigo** (1842-1918), Italian composer and poet, was born in Padua. His opera *Mefistofele*, produced in Milan in 1868, was a failure, but he remodelled the piece, and it was successfully produced in Bologna (1875) and other cities of Europe. Three later operas are: *Ero e Leandro*, *Nerone*, and *Orestide*. Besides writing his own librettos, Boito performed the same office for other composers.

**Bojer, Johan** (1872- ), Norwegian author, was born in Orkedalsoren, near Trondhjem. His first books *En Moder* ('A Mother') and *Helga*, published in 1894-5, were well received, and from that time he devoted himself to authorship. Among his writings are: *Dijrendal* ('God and Women') 1919; *Folk by the Sea* (1929).

**Bok, Edward William** (1863-1930), Am-

erican editor, author and philanthropist, was born in Helder, Netherlands, and removed to the United States with his parents in 1869. He was editor-in-chief of *The Ladies' Home Journal* (1889-1919) and after 1891 was vice-president of the Curtis Publishing Company, Philadelphia. In July, 1923, he offered a prize of \$100,000 for a practicable plan to enable the United States to co-operate with the nations of the world in keeping world peace. His *Americanization of Edward Bok*, published in 1920, was awarded the Pulitzer Prize, as the best biography of that year.

**Bokelmann, Christian Ludwig** (1844-94), German painter. His canvases display realistic conception, a fine eye for character, and telling arrangement. Among his best known works are: *In the Pawnshop* (1875); *An Itinerant Stall Before Christmas* (1878); *The Emigrants* (1882); *The Gaming Tables at Monte Carlo* (1884); *The Opening of the Will* (1879); *The Arrest* (1881).

**Boker, George Henry** (1823-90), American poet and dramatist. His tragedy *Calynos* was successfully produced in London in 1849, and was followed in quick succession by *Anne Boleyn*, *Leonor de Guzman*, and the well known *Francesca da Rimini*. His other works include the dramas *The Betrothed*, *The Widow's Marriage*, *All the World a Mask*, and the poems *The Lesson of Life* (1847), *Plays and Poems* (1856), *Street Lyrics* (1865), *Königsmark, and Other Poems* (1869), *The Book of the Dead* (1882), *Sonnets* (1886).

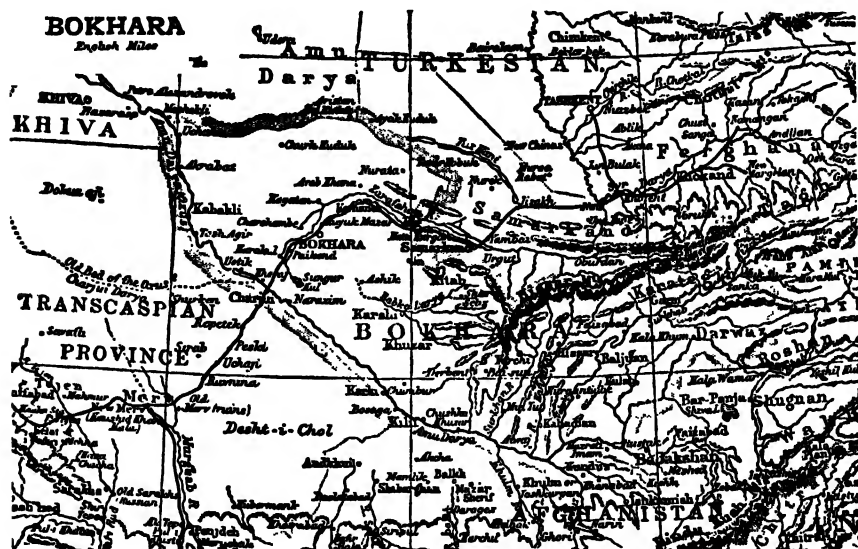
**Bokhara**, formerly a Russian protectorate of Central Asia, joined with Khiva in 1924 to form the Socialist Soviet Republic of Uzbek. It is bounded on the n. by the Russian provinces of Syr Daria, Samarkand, and Fergana; on the e. by the Pamir region; on the s. by Afghanistan; and on the w. by the Transcaspian Territory and Khiva. Area, about 79,000 sq. m. The soil in the river valleys and oases is very fertile; but the climate is excessively dry, especially during the summer months, and agriculture is wholly dependent on irrigation. The mulberry tree thrives everywhere, and silk culture is an important industry. Manufactures consist principally of textile fabrics, made by hand, and the rugs for which the country is famous. The population of Bokhara is estimated at about 3,000,000. The two principal races are the Uzbeks and the Tajiks.

Consult Vambéry's *Travels in Central Asia*, *Sketches of Central Asia* (1865), and *History of Bokhara*.

**Bokhara**, capital of the Soviet Republic of Uzbek, is surrounded by embattled walls of loess, about 24 ft. high, pierced by eleven gates. On an eminence in the centre of the town stands the Emir's old castle, the 'Ark,' surrounded by a wall 60 or 70 ft. high, which encloses as well the harem, state prison, and treasury. There are numerous bazaars, market places, mosques, and *medresses*, or colleges for Mohammedan students. One of the most beautiful mosques is Mashit-i-Kalân, attached to which is the Tower of the Dead, from which criminals were formerly hurled to death; p. 75,000.

*bourg* (Paris); *Ladies of the First Empire* and *Des Parisiennes* (New York City); portraits of Menzel (Berlin) and Whistler (Brooklyn); *The Spanish Dancer*; *Repose in the Atelier*; *The Connoisseur*; *Gossip*; *Kitchen Garden*; *Day Dreams*; *Fishing on the Seine*; *Delivering the Despatch*.

**Boldrewood, Rolf** (1826-1915), the pseudonym of THOMAS ALEXANDER BROWNE, Anglo-Australian novelist. His first and best work of fiction was *Robbery under Arms* (1888). His other works include: *The Miners' Right* (1890); *The Squatter's Dream* (1895); *Plain Living* (1898); *The Babes in*



**Bolan Pass**, a narrow gorge, hemmed in by steep cliffs, across the Hala Mountains to the highlands of Sarawan, Baluchistan. About 60 m. long, it is traversed by a military road.

**Bolas**, a weapon and hunting implement used by the Patagonians, Araucanians, and other tribes of the South American pampas. In its modern form it consists of three balls connected by three cords of almost equal length. In use the weapon is whirled about the head and thrown at a running animal, so that the balls wind round its feet and bring it to the ground. The Eskimos of Alaska use small bolas of ivory for catching birds.

**Boldini, Giovanni** (1845-1931), Italian portrait and genre painter, associated with the modern Parisian school. Among his works are: *The Portrait of a Lady* and *Au Luxem-*

*the Bush* (1900). In *Old Melbourne Memories* (1895) he has given a vivid account of his early experiences as a squatter.

**Bole**, an earthy, finely pulverulent mineral, mostly brown, but in some varieties red or yellow, found in the cavities of basaltic igneous rocks. It is employed chiefly as a pigment, and was formerly used in medicine.

**Bolero**, a Spanish national dance, invented in 1780 by Sebastian Zerezo. It is danced in moderately quick three-quarter time by two persons to the accompaniment of castanets and guitar. The name is also applied to the air to which it is danced; also to a short, sleeveless coat worn by Spanish peasant women.

**Boleyn, (Bullen), Anne** (1507-36), second wife of Henry VIII. Anne, a striking and clever brunette, had some futile courtships; but in 1526 she attracted Henry. Anx-

ious to have a legitimate son, vexed at Catherine's foreign leanings, and galled by her scant personal respect, Henry set about getting rid of her. He married Anne about Jan. 25, 1533. The child was born on Sept. 7, but proved to be a daughter, the future Elizabeth. Henry hated Anne for her unbridled ill temper, jealousy, and impatient scorn. On May 2, Anne was committed to the Tower and on the 17th she was tried on charges of adultery by a court of twenty-four peers, including her uncle, the Duke of Norfolk. Found guilty, she was beheaded on May 19th, 1536.

Consult Martin A. S. Hume, *The Wives of Henry VIII* (1905); B. Fitzpatrick, *Frail Anne Boleyn* (1931); P. W. Sergeant, *Life of Anne Boleyn* (1923); F. Hackett, *Henry VIII* (1931).

**Bolgary**, or **Bolgara**, a region in Russia Tartar S.S.R., s. of Kazan, on the Volga. Here during the excavations begun in 1722, many ancient coins and inscriptions were found.

**Bolide** is a name given to a large meteor which explodes and falls in aerolites; a fire-ball.

**Bolingbroke Henry St. John, Viscount** (1678-1751), English statesman and speculative writer. He wrote much that was posthumously published: *True Use of Retirement*, *Study and Use of History*, *Spirit of Patriotism*, and the *Idea of a Patriot King* (1738). The last had a curiously tenacious influence for a century, inspiring Tory politicians from Bute to Disraeli. Bolingbroke's writings, like his statesmanship, are at bottom little but rhetoric or party weapons. Consult also Leslie Stephen's *Religious Thought in the Eighteenth Century* (1876).

**Bolintineanu, Dimitrie** (1826-72), Rumanian poet, founded the *Dimbovitza* (1861), in which he vigorously sustained the popular cause against the boyars. His works, which include some of the best poetry in the language, are the collections *Cantece si Plangeri*; *Legendele Nationale*; *Basmele*; *Florile Bosforului*.

**Bolivar**, department of Colombia, South America, bounded on the n. and w. by the Caribbean Sea. The climate is tropical, except in the southern highlands. Cattle raising is an industry of first importance, and many cattle are exported. Capital, Cartagena. Area, 23,515 sq. m.; p. 934,150.

**Bolivar**, largest state of Venezuela, South America, includes the gold-mining territory of Yuruari. There are vast stretches of savannah, which have proved excellent for cattle

breeding. Sugar cultivation is an important industry in the eastern districts, where there are many plantations and mills. Capital, Ciudad Bolivar. Area, 90,440 sq. m.; p. 122,114.

**Bolivar**, province of Ecuador, located on the central plateau of that country. It is heavily wooded, and has forestry, agricultural, and pastoral resources. Capital, Guaranda. Area, 1,159 sq. m.; p. 104,872.

**Bolivar, Simon** (1783-1830), South American patriot, known as 'the Liberator,' was born in Carácas, Venezuela, of a noble Spanish family. He early identified himself with the movement for the independence of Venezuela. He distinguished himself in battles against Spanish troops; experienced varying fortunes as a dictator and president; and throughout the period from 1812-1830 he struggled for the independence of the South American colonies, Venezuela, Peru, Ecuador, and Colombia. He prepared a famous code for the government of Peru. In November, 1829, Venezuela separated from Colombia, and Bolivar laid down his authority and retired to Cartagena. He died at San Pedro near Santa Marta. He has been designated the 'Washington of South America.' The difficulties of the war of liberation compelled him to assume a dictator's power, but he was sincere in his devotion to liberty; and in the service of his country he gained no wealth, but freely spent his own fortune. Consult Ybarra, T. R., *The Passionate Warrior, Simón Bolívar* (repr. 1942); Masur, Gerhard, *Simon Bolivar* (1948); Frank, W. D., *The Birth of a World: Bolivar in Terms of His Peoples* (1951).

**Bolivia**, a republic of South America, formed in 1825, derives its name from Bolivar. Formerly called Upper Peru, part of the viceroyalty of Buenos Aires; p. 3,107,000.

Nearly three-fourths of Bolivia is covered with forests containing much valuable timber, and many fur-bearing animals. It is extremely rich in minerals and mining is the only important industry. The silver mines are extremely rich. Nearly every stream coming down the Andes carries gold, and it has been found also in the rivers flowing into the Amazon. Area 416,040 sq. m.

Bolivia is governed by a president elected for four years, a Senate elected for six years, and a Chamber of Deputies elected for four years—all by direct popular vote. There are two vice-presidents, and a Cabinet of six ministers appointed by the president. For two centuries after the Spanish conquest the

country formed part of Peru. Bolivia proclaimed its independence in 1825, after the overthrow of the Spanish at Ayacucho (1824).

In 1903 the boundary dispute with Brazil was settled, but there remained the Gran Chaco dispute with Paraguay, which flared up in 1928 and caused war to be declared in 1933, after offers by Brazil and the League of Nations to mediate had been refused. On June 12, 1935, an armistice was brought about through the efforts of Argentina, Brazil, Chile, Peru, Uruguay, and the United States, and a treaty of peace signed July 21, 1938. This was ratified in August. In 1927 plans offered by the Kemmerer commission from the United States were carried out by the reorganization of the financial and banking systems. The revolution of 1930 brought a military junta into power, following which President Salamanca was inaugurated in 1931. In that year the nation went off the gold standard and in 1932 Bolivia was forced to default on its foreign debt. In 1936, President Sorzano was ousted by a military junta. In 1939 President Busch died, and Gen. Quintanilla became president. Gen. Enrique Penaranda became President 1940. Jan. 28, 1942 Bolivia broke diplomatic relations with, and April 7, 1943, declared war on, the Axis Powers. In 1946, following a popular uprising against Dictator Villarroel, the President was murdered. Victor Paz Estenssoro was elected president May 6, 1951.

**Boll**, the rounded pod or capsule of such plants as flax and cotton.

**Bollandists**, an association of Jesuits by whom the *Acta Sanctorum*, or Lives of the Saints of the Christian Church, were collected and published (1643-1794). They received their name from JOHN BOLLAND (1596-1665), born in the Netherlands.

In 1837 a new Bollandist association of Jesuits was formed under the patronage of the Belgian government.

**Bolles, Albert Sydney** (1846-1939), American economist. He has written: *Banking; Industrial History of the United States; The Modern Law of Banking; The Conflict between Labor and Capital; Money, Banking, and Finance*.

**Bolley, Henry Luke** (1865- ), American plant pathologist. He made a special study of plant diseases, and is credited with the first use of formaldehyde upon seed grain to prevent smut.

**Boll Weevil**, a small grey weevil about ¼ inch long, which is the most serious pest

of cotton in the United States, infesting in 1929 more than 90 per cent of the nation's cotton fields. It first entered the United States in 1893. The adult weevils puncture the young flowers and deposit eggs. They also lay eggs later in the year in the young bolls, and when the grubs develop, the cotton is ruined. For many years all attempts to destroy the weevil met with scant success. Since 1923 applying poison by airplane has become very successful. Specially designed low-flying planes are used and the total cost in 1929 was as low as a dollar an acre. Sunshine and hot, dry weather, predacious birds and insects are enemies of the weevil. Consult *Bulletins* of the U. S. Department of Agriculture.

**Bollworm**, a caterpillar, also called corn ear worm, tomato fruit worm, and false budworm (of the tobacco plant), which is a pest in practically all parts of the United States, causing enormous losses annually. It bores into flower buds and young bolls, causing them to drop. The moth is about 1 1/3 inches across the spread wings and of color ranging from light brown to pale yellow. The full-grown larvae are about 1½ inches long and of a color varying from pale green to black. They spend the quiescent stage in cells 1 to 4 inches underground. Consult *Farmers' Bulletin 1595* of the U. S. Department of Agriculture (1929). The Pink Bollworm, one of the most injurious insects, is not to be confused with the bollworm.

**Bolo**, a large steel knife with a thick blade, used by the natives of the Philippine Islands both as a tool and a weapon.

**Bologna** (ancient *Bononia*), city, capital of the province of Bologna, Italy, is one of the ancient cities of Italy, founded about the 8th century, B.C. The older central parts are adorned with many fine palaces of the nobility, rich in fresco paintings by the great masters. The religious edifices are remarkable for the beauty of their architecture and for the abundance and splendor of the art treasures they contain. In the centre of the city are two remarkable leaning towers—Torre Asinelli and Torre Garisenda—belonging to the 12th century. The University of Bologna, the oldest in Europe, claims to have been founded in 425; it certainly dates as a law school from the 11th century. Its reputation early became so great, chiefly on account of its school of jurisprudence, that students from all parts of Europe were attracted to it. In 1262 the number receiving instruc-



tion is stated to have been 10,000. The university holds a first rank among Italian educational institutions.

Bologna owes its origin, which is said to be much more remote than that of Rome, to the Etruscans, by whom it was called *Felsina*. In 1860 the city became part of the modern kingdom of Italy; p. 338,710. Consult Coulson-James, *Bologna* (1909); and A. J. Wiel, *Story of Bologna* (1923).

**Bologna, Giovanni or Gian** (1524-1608), sculptor of the Italian renaissance, called IL FIAMMINGO, from his birthplace in Flanders. His statues are characterized by classic simplicity and nobility of form; the chief are the bronze *Mercury*, in the Bargello at Florence; the *Rape of the Sabines*, in the Loggia dei Lanzi at Florence; and the equestrian statue of Cosimo I. (1594), grand duke of Florence.

**Bologna University.** See **Bologna**.

**Bolometer** ('ray measure'), an instrument invented by S. P. Langley for the measurement of radiant heat. The principle of its construction is the change of electrical resistance which is produced in metallic conductors by variations of temperature. In Langley's improved apparatus all the movements are automatic. His perfected bolometer records differences of temperature not exceeding one ten-millionth of a degree centigrade.

**Bolshevism** (derived from *Bolshevik*, plural *Bolsheviki*), a term loosely used to denote the Russian Soviet Republic.

The word, from *bolshinstvo*, majority, originated in 1903 to designate the majority of the Russian Social Democratic Labor Party. During the great revolutionary ferment of 1903-5 a profound cleavage, both as to the ideals and methods of attainment of the Socialist state, developed between the two factions of the party, and the Bolsheviks, no longer the majority faction, became the radical left wing, sharply differentiated from the great majority of Social Democrats in their program. On outbreak of World War I in 1914, while the socialists rallied to the national defense, the Bolsheviks branded the war a crime. After arrest of the leaders at Viborg, Nov. 17, 1914, the movement was limited to seditious propaganda under direction of Nicholas Lenin, whose real name was Vladimir Ulianov. The overthrow of the Tsar, March 16, 1917, was effected by the Duma and revolutionary councils of soldiers and workmen in the capital.

A constituent assembly to form a perman-

ent form of government was early determined upon by the provisional government. The task of establishing the electoral machinery for a first election on the principle of universal and secret suffrage in a country so huge, so heterogeneous, and so lacking in transport system, however, was immense, and it was found necessary to postpone the date of the election from Sept. 30, to Nov. 25, 1917, though every effort was made to organize a permanent constitutional government at the earliest possible date.

The insurrection of General Kornilov gave the Bolsheviks the opportunity they sought. On Sept. 3, Riga was surrendered to the Germans, and panic reigned in Petrograd. Kornilov charged Kerensky with collusion with the German general staff under pressure from the Bolsheviks. Kerensky ordered Kornilov's removal, but the General replied by dispatching troops from the front to seize the government at Petrograd.

Now, however, the Bolsheviks raised the cry of counter revolution. The Revolution must be saved from the agents of the Tsar Kornilov to them was the old hated *régime*. The Kornilov forces melted away before Petrograd was reached, but the battle cry 'save the revolution' was turned against the Kerensky government. The provisional government was charged with being the enemy of the Russian people because it had delayed calling the constitutional convention and because it had not given the land to the peasants. A revolution was openly called for and revolutionary troops (Red Guard) were formed from deserters from the army. A new All-Russian Congress of Soviets had been elected to meet Nov. 7, in which for the first time the Bolsheviks, not without suspicion of intimidation and fraud, had secured a majority. On the night of Nov. 6, 1917, the Bolshevik coup took place, and on the seventh most of the members of the government were arrested. Kerensky escaped. Little blood was shed.

A new government was formed under an executive committee called the Council of Peoples' Commissars with Nicholas Lenin as President and Leon Trotsky Commissioner of Foreign Affairs. Lenin was dictator of Russia in the name of the proletariat, and by virtue of the power of the Red Guards. Thus the Russian Socialist Federal Soviet Republic was born.

The constituent convention was generally looked forward to as the salvation of Russia. When the convention finally met, Jan. 18,

1918, Sverdlov, for the Bolsheviks, presented a 'declaration of rights of the toiling and exploited peoples,' outlining a framework of soviet government, and limiting the power of the convention to the adoption of this plan.

The Lenin-Trotsky ministry had summoned an extraordinary Congress of Soviets to meet in Petrograd at the same time. This congress approved the declaration of rights, spurned by the constitutional convention, and thus established a permanent soviet government. This provisional constitution was later revised, elaborated, and adopted by the fifth Soviet Congress on July 10, 1918, as the permanent Constitution of Russia.

In the meantime negotiations for peace had been undertaken by Trotsky. An armistice had been signed and negotiations opened at Brest-Litovsk Dec. 22, 1917. Trotsky indignantly repudiated the exorbitant German peace terms, and counseled resistance by a new Red Army. He was overruled by the practical Lenin, and the peace terms were formally, if sullenly, accepted by the fourth Soviet Congress.

The strength of the Bolsheviks as an organized government lay largely in its use of the native institution, the soviet, which originated as a revolutionary committee of workmen in 1905. Soviets are of many kinds from the simple 'town-meeting' of the peasants, and the industrial 'union' or 'guild' of the factory to the great national assembly of delegates from all local, provincial and industrial soviets. The village or factory group was the unit. Central soviets of delegates from local soviets were formed in all townships, districts, provinces, and the national soviet of delegates was called together at least twice a year to exercise supreme legislative power. All delegates were at all times responsible to the group from which they were elected and could be recalled at any time. Executive committees hold the supreme power when soviets are not in session. All soviets are responsible for the enforcement of the *general* laws as well as local ordinances and decrees. This plan of representative government is vitiated by limitations of franchise and inequalities of representation. Only the poorest peasants and the propertyless workers are permitted to vote.

The war-born Russian Soviet Republic was recognized by Lenin and the communists, as the Bolsheviks were originally called, as a transitional incomplete Socialist state. The ideal aim of the party was stated in the fa-

miliar terms of a communist utopia. 'The complete liberation of the laboring classes from spoliation and oppression' was represented as an international problem, to be accomplished only through the united exertions of workmen of all lands. The Soviet Republic urged the establishment of local soviets as centres of world revolution wherever possible, and extended to all such organizations an invitation to 'enter as members with equal rights into the fraternal family of the Republic of Soviets . . . to any extent in whatever form they might wish.'

**Bolt**, any metal pin which unites parts of structures or machines. The commonest form of bolt has a head and a screw thread toward the end, and is fastened up with a loose nut. In shipbuilding, bolts which completely penetrate a structure are *through* bolts; those which only partly do so are *blunt* bolts. *Eyebolts* have a hole in the projecting end; a ring through this hole turns the eyebolt into a *ring bolt*. The *Lewis bolt* is an eyebolt with a barbed shank fixed into a socket on the deck. The word is used in firearms for the part of a rifle which sends the firing pin home, and also for an elongated bullet.

**Bolton**, or **Bolton-le-Moors**, town, Lancashire, England. It is one of the chief centres of the cotton industry, and is noted for fine yarns. There are also manufactures of muslins and fine calicoes, foundries, iron works, bleaching, paper, and saw mills, and chemical works; p. 167, 162.

**Bolton, Charles Knowles** (1867- ), American author and librarian, was born in Cleveland, Ohio. He was librarian of the Boston Athenæum Library (1898-1933). His works include *The Elizabeth Whitman Mystery* (1912); *Christ Church*, 1723 (1913); *Portraits of the Founders* (1919, 1926); *Bolton's American Armory* (1927); *The Real Founders of New England* (1929).

**Bolton, Herbert Eugene** (1870-1953), American educator and historian, is known for his researches in the Mexican archives on the history of Spanish America and of the Southwestern Indians. He published *Guide to Materials for U. S. History in the Archives of Mexico* (1913); *Athanase de Mézières* (1914); and *Texas in the Middle Eighteenth Century* (1915); *Colonization of North America* (1920); *The Spanish Borderland* (1921); *Ansa's California Expedition, 1774-76* (5 vols. 1930); *Outposts of Empire* (1931).

**Belus**, a soft mass of any kind of medicine, intended to be swallowed at once. It is similar to a pill but is larger.

**Bomb, Bomb Shell**, a hollow projectile, usually of cast iron, fired from a piece of ordnance. Such projectiles were formerly fired from mortars only; but all modern pieces of artillery now use them. See also **AMMUNITION**; **EXPLOSIVES**; **GUNS**.

**Bomb**, in geology, a large round, porous mass of igneous rock often mixed with other varieties of volcanic ash and ejected by active volcanoes. They are simply a large form of the *lapilli* of which the ash beds principally consist. When such materials have, in course of time, been compacted into firm rock, they are known as volcanic agglomerate.

**Bombard**, a kind of cannon in use about the 14th century, sometimes capable of throwing balls of stone of 200 pounds weight.

**Bombardier**, the lowest non-commissioned officers in the British artillery.

**Bombardment**, an attack by artillery upon a fortress or town. In modern warfare attacks from the air are often called bombardments. In modern times a bombardment is generally adopted as an adjunct to a siege, distracting the garrison by an incessant fire from mortars and heavy guns day and night. A bombardment is more frequently a naval than a military operation. The Brussels Conference of 1874 drew up rules for the restriction of bombardment to fortified places and towns which actively oppose the enemy. The Hague Regulations, formulated at the Hague Peace Convention, also prohibit bombardment of undefended towns or buildings, provide that warning be given the authorities of intention to attack and that all possible steps be taken to spare buildings dedicated to art, science or religion, historic monuments, and hospitals.

**Bombay**, city, capital of the state of Bombay, India. It is the most European in appearance of all the cities of India, and is second only to Calcutta in commercial activity and population. It has many fine buildings. The Taj Mahal, opened in 1904, is one of the largest and best hotels in India.

Mazagaon Bay, the centre of shipping activity, is at the head of the harbor. Always favorably situated for foreign trade, Bombay has profited largely by being the first important port reached by vessels from Europe, and by being the chief mail line to India by Suez and Aden. All but an insignificant portion of the trade of the state passes through the port. The chief articles of export

are raw cotton, wheat, hides, coffee, pepper, linseed, manganese, gums, opium, ivory, and shawls; the chief imports, piece goods, thread, yarn, silk, wine, beer, tea, iron and steel goods, and coal. There are large cotton mills, tanneries, dye works, and shops for metal working.

Bombay is the headquarters of the government of the state, over which a high court exercises supreme jurisdiction. In municipal enterprise Bombay holds its own with the foremost cities of Europe. Since 1897 several visitations of bubonic plague have occurred, but an extensive scheme of sanitary improvement has been instituted.

Hindus and Mohammedans are the most numerous of the inhabitants, and include not only natives of India, but also Afghans, Arabs, Malays, and Africans; p. 2,840,011.

In 1509, about a year before the capture of Goa, the Portuguese visited Bombay, and by 1534 they had made it their own. In 1661 they ceded it to Charles II. of England, as part of the dowry of his bride, the Infanta Catharine. In 1668 that monarch granted it for an annual payment to the East India Company, which in 1685 transferred what was then its principal presidency to Bombay from Surat. Consult Forrest's *Cities of India*.

**Bombay Duck** (*Harpodon nehereus*), or **BUMMALOTI**, marine fish found in abundance on the east coast of India. Salted and dried, it is used to flavor rice, and forms part of all Indian curries.

**Bombay**, state, stretches along the west coast of India, from Gujarat in the north to Kanara in the south. It has an area of 114,548 sq. m. and a population of 29,450,000. These figures are inclusive of the Gujarat States and Kolhapur and Baroda, which have merged with Bombay.

The state embraces a wide diversity of soil, climate and people. There are the rich plains of Gujarat, watered by the Narbada and Tapti rivers, whose fertility is so marked that it has long been known as the Garden of India. South of Bombay city the state is divided into two sections by the Western Ghats, a range of hills running parallel to the coast. Beyond the Ghats are the Deccan districts; south of these come the Karnatic districts. On the sea side of the Ghats is the Konkan, a rice-growing tract, intercepted by creeks which make communication difficult.

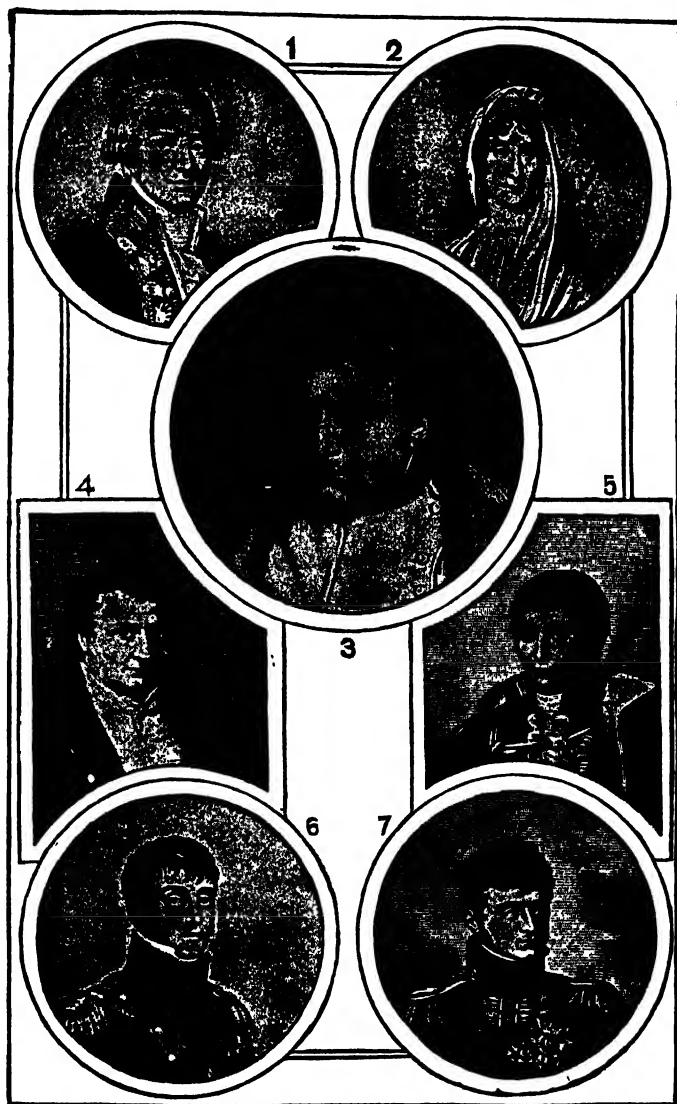
The rainfall of the state is derived chiefly from the south-west monsoon between June and October. The amount of rainfall varies

widely in different areas from 30" to about 150" annually.

The population varies as markedly as soil and climate. Gujarat has remained true to Hinduism although long under the domination of powerful Moslem kings. The population of the Deccan is much more homogeneous than that of Gujarat, 30 per cent being Marhattas. The Karnatic is the land of the

Lingayats, a Hindu reforming sect of the 12th century, and in the Konkan there is a large proportion of Christians. Three main languages are spoken: Gujarati, Marathi and Kannada, with Hindustani a rough *lingua franca* where English has not penetrated.

The principal occupation is agriculture, which supports 64 per cent of the population. In Gujarat the soil is of two classes, the



*The Bonaparte Family.*

1. Charles, and 2. Letitia, the father and mother. 3. Napoleon I. 4. Lucien. 5. Louis. 6. Jérôme.

black cotton soil, which yields the famous Broach cottons, the finest in India, and alluvial, which under careful cultivation in Ahmedabad and Kaira makes splendid garden land. The dominant soil characteristic of the Deccan is black soil, which produces cotton, wheat, gram and millet, and in certain tracts rich crops of sugar-cane. The Konkan is a rice land, where the crop is grown under abundant rains of the submontane regions, and in the south the Dharwar cotton vies with Broach as the best in India.

There are no great perennial rivers suitable for irrigation, and the harvest is largely dependent upon the seasonal rainfall, supplemented by well irrigation. A chain of irrigation works, consisting of canals fed from great reservoirs in the region of un failing rainfall in the Ghats, is gradually nearing completion, and this will ultimately make the Deccan immune to serious drought.

The state of Bombay is not only the leading state in commerce and trade but, industrially, perhaps the most advanced state in India. It is one of the most important textile centers of the world. Out of the 417 textile mills in India, 208 mills are located in this state. Large-scale industry is concentrated in large cities such as Bombay, Ahmedabad, Sholapur, Poona and Satara. Several important industries are carried on, on a cottage scale, all over the state.

The government is administered by a Governor who is advised by a popularly elected council of ministers. The legislative power lies with the Legislative Council and Legislative Assembly. The party, which is returned to the Legislative Assembly in majority, is invited by the governor to form the ministry. The party elects a leader and he becomes the chief minister. The real executive power is exercised by the council of ministers. It is collectively responsible to the Legislative Assembly and the ruling party must enjoy the confidence of the lower house. The first general election of the state is to be held in December, 1951, on the basis of adult franchise. The capital city of the state is Bombay (a.v.).

**Bona**, the general term in Roman law for the property of any one, and in the modern system it is used in various connections. A thing is said to be *in bonis* of a person when it is part of his belongings. *Bona vacantia* in Roman law denoted the property of one who had died intestate and without leaving any legal representative who claimed the inheritance. In English and American

law the same term is applied to such things as wrecks, treasure trove, waifs, estrays, etc., which belong not to the finder or occupier, but to the Crown or state. *Bona waviata* denote goods thrown away by a thief through fear of apprehension. *Bona notabilia* are goods of a deceased, the value of which is not so small as to render them negligible. *Nulla bona* is the technical description of a return of an execution, where *no goods* are found to satisfy the claim. In English and American law *bona* includes only personal or movable property, not real property.

**Bona Dea** ('the good goddess'), a Roman divinity, sister, wife, or daughter of Faunus, and variously known as FAUNA, FATUA, or OMA. Her worship was exclusively confined to women, and she was revered as a chaste and prophetic deity.

**Bona Fides** (Latin, 'good faith,' as opposed to *mala fides*, 'bad faith'), a legal term to denote the condition of one who becomes a purchaser of property without notice of equitable claims affecting it in the hands of the vendor. Such a purchaser, if his legal title is good, is protected against the equitable claims of third persons. Any *bona-fide* purchaser will be supported by a court of law.

**Bonald, Louis Gabriel Ambroise, Vicomte de** (1754-1840), French philosopher and statesman, born at Mouna (Aveyron). He retired with other royalist *émigrés* to Heidelberg in 1791, and there wrote *Théorie du Pouvoir Politique et Religieux dans la Société Civile* (3 vols. 1796). At the restoration he became minister of state (1822).

**Bonanza** (Lat. *bonus*, through the Spanish), a miner's term for the discovery of a rich vein of ore.

**Bonaparte, Napoleon**. See **Napoleon I**. **BONAPARTE, CHARLES**, or **CARLO BUONAPARTE** (1746-85), was a Corsican lawyer, father of Napoleon Bonaparte. In 1767 he married Maria Letitia Ramolini, a strong-minded and accomplished patrician lady. In 1773 he was appointed royal counsellor and assessor of the town and province of Ajaccio. Napoleon's mother was styled 'Madame Mère' after his coronation in 1804. Among her children were:—

1. **BONAPARTE, JOSEPH** (1768-1844). When his illustrious brother rose into power, he was appointed commissary-general, and in 1797 was sent as ambassador to the Pope. In 1800 he was chosen plenipotentiary to the United States to conclude a treaty of friendship between that country and France. In 1808 his brother made him king of Spain:

Wellington's triumph at Vitoria in 1813 at length put an end to his mock sovereignty. On the final fall of his brother he emigrated to the United States, where, under the name of the Count de Survilliers, he lived at Bordentown, N. J., from 1815 until 1832.

2. BONAPARTE, NAPOLEON. See NAPOLEON I.

3. BONAPARTE, LUCIEN (1775-1840). In 1798 he was elected to the Council of the Five Hundred. He was subsequently minister of the interior, and in 1800 was sent as ambassador to Spain. In 1810 he embarked for the United States, but was captured by the British, who detained him until 1814. Becoming reconciled to his brother, he stood by him during the struggle of the Hundred days; and it was by his advice that the emperor abdicated in favor of his son.

Prince Lucien Bonaparte left five sons and two daughters. The eldest son, CHARLES LUCIEN JULES LAURENT BONAPARTE (1803-57), lived in Philadelphia (1822-28) and became known as a naturalist and especially as an ornithologist. His *American Ornithology* (1824-33) was afterward combined with the work of Wilson, as *Wilson and Bonaparte's Ornithology*, a work which is still very valuable. He succeeded to his father's title in 1840.—PAUL MARIE BONAPARTE (1808-27), second son, took part in the Greek war of liberation. LOUIS LUCIEN BONAPARTE (1813-91), the third son, became an eminent philologist, and an authority upon the Basque (*Langue Basque*, 1862) and Celtic languages.—PIERRE NAPOLEON BONAPARTE (1815-81), the fourth son, spent much of his erratic career in Italy, Belgium, America and England.

4. BONAPARTE, MARIE ANNE ELISA (1777-1820), became Grand Duchess of Tuscany in 1809.

5. BONAPARTE, LOUIS (1778-1846), king of Holland, was in his brother's Italian and Egyptian campaigns. In 1802, in deference to the wishes of Napoleon, he married Hortense (1783-1837), daughter of General Beauharnais by his wife Josephine, afterward empress of the French.

6. BONAPARTE, MARIE PAULINE (1780-1825), also called CARLOTTA, was Napoleon's favorite sister, and, with her mother, shared his exile at Elba.

7. BONAPARTE, CAROLINE MARIE ANNONCIATA (1782-1839), married Murat, king of Naples.

8. BONAPARTE, JEROME (1784-1860), king of Westphalia, the youngest brother of Napoleon I., was born at Ajaccio, and served as

naval lieutenant in the Hayti expedition (1801). When war broke out between France and England, Jerome fled to New York and was married to Elizabeth Patterson of Baltimore. The marriage was annulled by Napoleon in 1805, and Madame Bonaparte was not allowed to enter France. In 1806 he fought in the war against Prussia, and in 1807 was made king of Westphalia. He commanded a division at Waterloo, in 1850 was created a marshal of France. See NAPOLEON; also Ludwig, Emil, *Napoleon* (1926).

**Bonaventura**, or **Buonaventura**, St. (1221-74), scholastic theologian and mystic. In 1238 he became a Franciscan friar. He received his doctor's degree at Paris after a great controversy, and in 1257 became minister-general of the Franciscans. He was created a cardinal in 1273. He accompanied Gregory X. to the Council of Lyons, during the session of which he died (1274).

**Bonavista**, seapt., Bonavista dist., Newfoundland, one of the oldest settlements in Newfoundland.

**Bonbright, James C.** (1891- ), American financial expert, professor of economics in Columbia University. Consultant on various commissions; delegate from the United States to the World Power Conference at Stockholm, 1933. His published works include *Railroad Capitalization* (1920) and *The Holding Company* (joint author, 1932).

**Bond**. An instrument under seal by which one person, called the obligor, promises to pay another, known as the obligee, a specified sum of money. Government securities are usually in the form of bonds. Though not strictly negotiable instruments, corporate bonds of all kinds are freely transferable and constitute a favorite form of investment of private capital.

**Bond, Sir Robert** (1857-1927), premier and colonial secretary of Newfoundland, born in Newfoundland. He negotiated with Secretary Hay the Hay-Bond treaty which the U. S. Senate refused to ratify. He was also a delegate on the Newfoundland fisheries question (1892).

**Bond, William Cranch** (1789-1859), American astronomer, was born in Portland, Me. He was appointed (1838) by the U. S. government to make observations for the use of the Wilkes's exploring expedition to the South Pacific; discovered the eighth satellite of Saturn (Sept. 19, 1848), invented the chronograph (1850), and was one of the first (1848) to photograph celestial bodies.

**Bonded Warehouse**, a warehouse used

for storing bonded goods, goods subject to internal revenue or customs duty, but on which the duty has not been paid.

**Bonds.** See **Stock** and **Stockholder**; **Stock Exchange**.

**Bone** is one of the hardest structures of the animal body, and possesses also a certain degree of toughness and elasticity. It serves as the framework or skeleton of the body. The organic substance is chiefly collagen—a substance which is converted into gelatin by boiling. A section of bone is seen to be composed of two kinds of tissue—one external, a spongy or cancellous tissue resembling a lattice-work.

Diseases of bone may be classified as follows: *Bacterial diseases*—pyogenic, tuberculous, syphilitic. *Parasitic diseases*—actinomycosis, mycetoma, hydatid cysts. *Trophic diseases*—rickets, scurvy, osteomalacia, osteitis deformans, fragilitas ossium. *Tumors and cysts*—Bones are frequently the seat of tumors, both primary and secondary. For the morphology of bones, see **SKELETON**.

**Bone Ash**, or **Bone Earth**, the residue obtained by calcining bones in the presence of air, is the basis of several artificial fertilizers and is used in preparing phosphorous.

**Bone-Black**, or **Animal Charcoal**, is obtained by heating bones, from which the fat has been removed by a solvent or by boiling, in retorts from which air is excluded. Its principal use is in sugar-refining.

**Bone Fertilizers.** The fertilizing value of bones is determined by the phosphoric acid and nitrogen they contain. The proportion of these constituents depends upon the kinds of bones and the treatment to which they have been subjected. The larger part of the bone used for fertilizers is either boiled or steamed at high temperatures.

When a considerable amount of meat scraps or other animal refuse is left with the bones a variable product, known as bone tankage, is obtained, which is usually richer in nitrogen and poorer in phosphoric acid than unmixed bones. This product is very extensively used, especially in the preparation of mixed fertilizers. Bones give best results on slow-growing crops.

**Boner**, Ulrich, writer of fables, a native of Bern, compiled the oldest book of fables in German, his *Edelstein*, to serve as a 'talisman' against the evils and errors of the world.

**Boneset.** A sturdy composite plant (*Euthatorium perfoliatum*) used in domestic medicine.

**Bonfire** ('bone-fire,' 'fire of bones'), prob-

ably originating in the funeral pyre. Bonfires were lighted in early times to avert plagues or evil spirits, and became connected with ceremonial observances. See **BEACON**; **BELTANE**; and Brand's *Popular Antiquities*, i. (1849).

**Bonheur**, Rosalie or Rosa (1822-99), French painter of animals, was born at Bordeaux, but early moved (1830) to Paris. Rosa's habit was to study animals not only in their anatomy, but also in their passions. With this object she frequented markets and slaughter-houses. The *Horse Fair* was painted in 1853; the original is in the Metropolitan Museum in New York.

In 1865 the Cross of the Legion of Honor was conferred on her by the Empress Eugénie, who was at the time acting as Regent. She painted in Spain and Scotland, but her usual residence was near Fontainebleau. Consult Stanton, Theodore, *Reminiscences of Rosa Bonheur* (1910).

**Boniface**, the name of nine Popes. **BONIFACE I.**, bishop of Rome (418-422), was a contemporary of St. Augustine. **BONIFACE III.** was consecrated Pope in February, 607, and died in October of the same year. **BONIFACE V.** (619-625) did much for the Christianizing of England. **BONIFACE VIII.**, **BENEDICT CAJETAN** (1294-1303), strongly upheld the temporal as well as the spiritual power of Rome, and was involved in disputes. **BONIFACE IX.**, **PIETRO TOMACELLI** (1380-1404) during the reign of Clement VII. asserted his right to the Papedom, and held his court at Avignon. Consult McKilliam's *A Chronicle of the Popes*.

**Boniface**, St. (680-755), the monastic name of Winfried, archbishop, and the great 'Apostle of Germany,' a native of Crediton, Devonshire. In 718 he went to Rome, where he was commissioned by Gregory II. to the heathen nations of Germany. Gregory III. appointed Boniface Archbishop and Primate of all Germany. During an open-air confirmation service in Friesland in 755, Boniface and his converts were massacred by the heathen. There is a Life of Boniface by Willibald (in *Monumenta Germaniæ Scriptores*, vol. ii. 1829), and his *Letters* have been edited by Giles (1844) and Jaffé (1866).

**Bonington**, Richard Parkes (1801-28). English artist. His work belongs to the French rather than to the British school. His landscapes (especially in water-color) and his historical paintings are famous for their brilliancy of coloring.

**Bonito**, (*Thynnus pelamys*), a fish allied to the Mediterranean tunny.

**Bonivard, or Bonnivard, François de** (1493-1570), the reputed original of Lord Byron's *Prisoner of Chillon*, succeeded his uncle as prior of the Cluniac monastery at Geneva. Owing to his hostility to the Duke of Savoy, he was seized in 1530, and spent six

ter, an example of late Romanesque architecture, completely restored since 1875. In Bonn is located Beethoven's house, now a museum.

Bonn was almost destroyed by Elector Frederick III. of Brandenburg in 1689, and



Bonnets.

years in the castle of Chillon, during four of which he was underground.

**Bonn**, city, Germany, in the Rhine province. The river is here crossed by a beautiful bridge, and the villas with their lovely gardens on the Rhine make an attractive picture. The most conspicuous building is the Müns-

ter, an example of late Romanesque architecture, completely restored since 1875. In Bonn is located Beethoven's house, now a museum. Bonn was almost destroyed by Elector Frederick III. of Brandenburg in 1689, and

Bonatt, Leon Joseph Florentin (1833-



1922), eminent and powerful French painter. His *Assumption* (1869) is in Bayonne, and his *Martyrdom of St. Denis* in the Pantheon. But his fame rests chiefly on his portraits. Among his subjects were Victor Hugo, Thiers (Louvre).

**Bonner, Robert** (1824-99), American publisher, was born near Londonderry, Ireland. He went to the United States in 1839, bought the *Merchants' Ledger*, changed its name to the *New York Ledger* (1855), and maintained its record as the most popular weekly in the United States. He took great interest in fast horses, owning about fifty at his death.

**Bonnet**, a headdress of women worn out of doors, distinguished from a hat mainly by its covering no part of the forehead. The bonnet has been gradually superseded by the hat in England and America, although a distinctive part of the costume of certain classes, such as the Quakers, and of sisterhoods, as nuns and deaconesses. Also it is a headdress for men and boys, usually soft, and distinguished from the hat by the absence of brim.

**Bonnet, Charles de** (1720-93), Swiss naturalist. Bonnet's teaching is most perfectly summed up in his *Contemplations de la nature* (1764), and in his *Palingénésie philosophique* (1769-70), dealing with the immortality of all men and animals. He was strongly opposed to Voltaire and Rousseau. Consult *Mémoire* by Trembley (1794), and *Life* by the Duc de Caraman.

**Bonnet Piece**, a gold coin issued in 1539 and 1540, so called because the head of the King is adorned with a bonnet.



*Bonnet Piece*

**Bonnet Rouge**, the French liberty cap.

**Bonneval, Claude Alexandre, Comte de** (1675-1747), French soldier and adventurer. For insulting conduct to Prince Eugene he was dismissed for insolence and went to Turkey, being an officer in the Turkish army under the name Achmed Pasha.

**Bonneville Dam**, a gigantic power and navigation project situated on the Columbia

River at Bonneville, Oregon. The Bonneville Power Administration promotes markets for and sells power from this great dam.

**Bonny**, river, one of the east mouths of the Niger; formerly a notorious haunt of slave traders.

**Bonomi, Giuseppe, or Joseph** (1739-1808), British architect. His most celebrated buildings are the Italian villa at Roseneath in Dumbartonshire, Langford Hall in Shropshire, and Dale Park in Sussex.

**Bonsal, Stephen** (1865-1951), American newspaper correspondent and diplomat. In 1915 he was with Hindenburg's army on the east front; with A.E.F. in France 1918. He is the author of *Morocco as It Is* and 1944 Pulitzer Prize winner for his *Unfinished Business*.

**Bonsignori, or Buonsignori, Francesco** (1455-1519), Italian artist. Bonsignori was especially successful in historical subjects and as a painter of animals.

**Bonstetten, Karl Victor von** (1745-1832), Swiss littérateur. His most famous work is *L'Homme du Midi et l'Homme du Nord* (1824), one of the earliest treatises on the influence of climate.

**Bontebok** (*Bubalis pygargus*), a species of antelope closely allied to the hartebeest.

**Bonus**, an allowance in addition to that which is formally due. In industry the term bonus designates an extra payment made to employees as a reward for increased efficiency and effort. Such a bonus plan is often adopted by large banking houses, and the bonus is frequently given at the holiday season. Labor unions are often suspicious of bonus plans as expedients to outwit them; and occasionally employers use the bonus as a pretext for reducing costs and crowding the workers.

**Bonus, Soldiers'**, compensation granted to ex-soldiers at the conclusion of a war, without regard as to whether or not they incurred any disability. At the close of the World War I a Federal bonus of \$60 was awarded to every United States soldier upon his discharge from service. About 1920 a determined movement was undertaken for the payment of a further bonus to every man in the United States who had served in the War and a bill to that effect was passed over the President's veto, May 19, 1924.

After having been successively vetoed by Presidents Calvin Coolidge, Herbert Hoover and Franklin D. Roosevelt, the united front bonus bill was passed by both houses of Congress in January, 1936, over the President's

veto. The bonus was paid in negotiable Government bonds in June, 1936. Of the \$1,728,858,100 bonus bonds issued in June, nearly 75 per cent had been cashed by December 1, 1936.

The main features of the bill are as follows: Men who served less than sixty days receive nothing in addition to the \$60 which they received upon discharge. Those who served between 60 and 110 days receive a cash payment of \$1.00 for each day served in excess of 60. Other veterans receive twenty-year endowment insurance policies, the value of the policy being determined by length of service, and whether this was overseas or at home. The average bonus received was about \$550. All ex-soldiers up to the grade of captain in the army and lieutenant in the navy were eligible, and dependents of dead veterans received their bonus.

A considerable number of the States also made provision for the payment of bonuses to their ex-service men and West Virginia gave \$25 each for the burial of impoverished deceased veterans.

In Great Britain gratuities to non-commissioned officers and men who served in World War I were paid on demobilization.

The Canadian government passed a law in December, 1918, establishing a 'war gratuity,' applying to all officers, non-commissioned officers, and men of the Canadian land and naval forces. See PENSIONS.

**Bonvin, François Saint** (1817-87), French painter and etcher, was born in Vaugirard. He treated lamplight effects with great success, notably in *A Woman Eating* (1848), *The Etcher* (1873). He is represented in the Luxembourg at Paris by *The Servant at the Fountain* and *The Refectory*.

**Bony Fishes**, or **Teleostean**s, an important order of fishes, including the vast majority of living forms. Since their first appearance, apparently in Jurassic times, they increased in numbers until at the close of the secondary epoch they acquired the numerical superiority which they have never since lost.

**Bonze**, *bonz* or *bon'ze*, a member of a Buddhist fraternity; but the name is generally applied to any Asiatic monk or priest.

**Booby**, a name applied to those species of the bird genus *Sula* in which the whole of the lower jaw and throat is bare of feathers. They are large birds, from 28 to 30 inches in length. They owe their common name to their seeming stupidity in allowing themselves to be caught by hand.

**Booby Island**, small, rocky island, dangerous to the navigation of Torres Strait, Queensland, Australia.

**Book** (O. E. *bōc*), originally a writing-tablet, or board of beechwood; then any written document, more especially a charter or legal deed; a treatise or series of treatises written or printed on a number of leaves of paper or other material fastened together at the back and in some kind of binding; by transference, the literary or other contents thus preserved. An unbound book of less than one hundred pages is commonly called a pamphlet. Literary manuscripts of antiquity are spoken of as books when they are written on sheets of paper or vellum, or any substitutes for these, fastened and bound as already described. Previous to the introduction of this book form, literary works written on various materials, as bark, papyrus, parchment, paper, or skins, were put together in any portable form, commonly in rolls made by gluing together pieces of papyrus or vellum, or the separate leaves were strung or hinged together.

The earliest printed books were formed of leaves of parchment or of paper laboriously printed from xylographic plates, that is, plates of wood, on which an engraver had cut in relief the letters and figures of the text. The so-called block books were thus printed. The invention of printing from movable type, *typography*, marked the beginning of modern bookmaking. The earliest books printed from movable type imitated closely the manuscripts which they quickly superseded. Thus the earliest books have no title page, the place of printing or publication, name of printer or publisher, and date of issue, being either withheld altogether or placed in a colophon or closing paragraph.

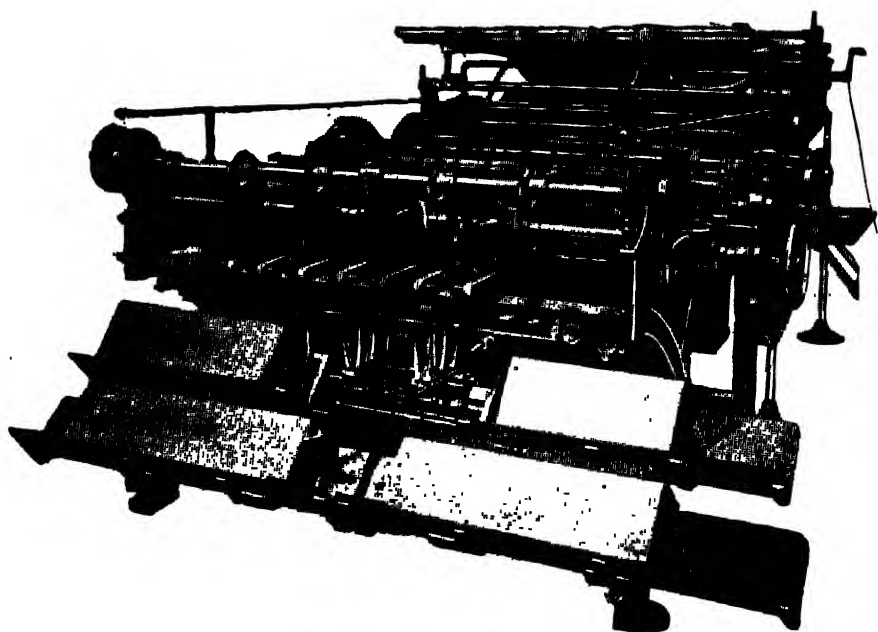
The writers of mss. made up their books in quires or gatherings of four to six sheets of paper or vellum, folded once and placed one within the other, forming sections of 8 to 12 leaves. These sections correspond to the folded sheets of the modern book. In most early books the leaves are left unnumbered, leaf numeration being first used in 1471, making its way gradually, and being slowly replaced by pagination during the 16th century. The size of books is determined primarily by the number of times the sheets of paper used in a book are folded.

As sheets of paper from different makers varied greatly in dimensions, the American Library Association in 1878 adopted the plan

of indicating the size by giving the size from actual measurement of the outside height in centimeters. The simplicity and exactness of this size notation have led to its general adoption in American libraries, and by the *Publishers' Weekly* office for all publications issued therefrom. The first book printed in the American colonies was the *Bay Psalm Book*, compiled by Richard Mather, Thomas Welde, and John Eliot, the Indian missionary; it was printed in 1640 by Stephen Daye of Cambridge, Mass.

*The Printed Book* (3rd ed. 1951); *Publishers' Weekly*, 1- (1884- )

**Bookbinding.** Binding began when it became necessary to fasten together for preservation the inserted leaves or folded sheets of four, eight, twelve or more leaves of the written manuscripts of the monastic scribes. Threads were passed through the back folds of each section and around narrow bands of vellum or leather, the ends of which were laced into the boards forming the sides of the books. In ordinary binding these boards

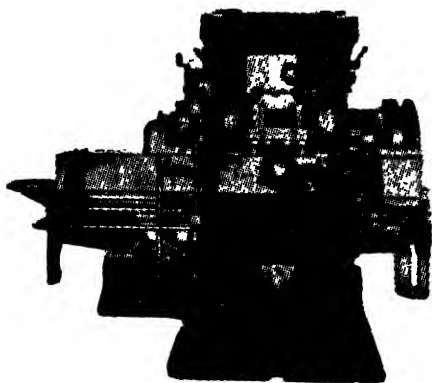


*New Quadruple Folding Machine.*

The book has always preserved for us a very exact image of the epoch in which it was written or printed, and a study of the manuscripts or printed books from different countries, showing the development of the caligraphic or typographic arts will also reveal the growth of literary taste during the same periods. It is a fact to be noted that the finest of the earliest books printed in the blackest of ink on the whitest of vellum, or paper almost equal to vellum, have never been equalled by the modern bookmakers; their only rivals are the elegant manuscripts which they superseded. Consult *McMurtrie, D. C., The Book; the Story of Printing & Book-making* (3rd ed. 1943); *Aldis, H. G.,*

of hard wood were covered with leather which was protected by metallic bosses, corner plates and other ornaments, and clasps. In the earliest English bindings which have come down to us from about the 10th century, the boards are covered with deerskin or other leather, on which numerous small stamps, from half an inch to an inch in size, containing figures of animals or conventional designs, have been impressed. In the 12th and 14th centuries the boards of very valuable books, more especially copies of the gospels for use in church, were covered with carved ivory or metal, and frequently studded with gems. Towards the end of the 15th century the use of gold leaf in the decoration of blind-

ings was introduced into Venice from the East; and with it an Oriental style of ornamentation showing the Arabic or Saracenic origin of this kind of decoration. Under the patronage of Jean Grolier and other wealthy book-lovers, many beautifully-decorated bindings were produced in Italy in the first half of the 16th century, of such exquisite design and workmanship as to command the admiration and imitation of the best workers of all succeeding periods. In Germany many good bindings in white pig-skin were executed in the 16th century; here gold-tooling arrived late, and never developed any originality. In England, with the assistance



*Modern Automatic Rounding and Backing Machine.*

of Italian workmen, Thomas Berthelet, printer and bookbinder to Henry VIII., turned out some excellent bindings; and, under the patronage of Archbishop Parker the workmen of John Day established a heavy and dignified English style, well suited to large folio volumes.

During the 19th century binding all over Europe suffered from the slavish imitation of old designs, but in the latter half of the century, especially since the Paris Exposition of 1867, the binders of England and of France have put forth some excellent work. A collection of the best work done by American binders during the same period would more than hold its own in comparison with foreign work. To the late William Matthews must be assigned the first place in the ranks of American bookbinders.

**Machine Bookbinding.**—The requirements of modern publishing have made cheaper and speedier methods necessary, and practically every operation in bookbinding may now be

performed by machinery. Modern bookbinders divide their work into three sections—‘sheet work,’ which includes folding, gathering, and sewing; ‘forwarding,’ or preparing the book and putting on the cover; and ‘finishing,’ or decorating the cover. Forwarding includes the operations of trimming, gluing, papering, lining, rounding and backing, case-making and covering. Folding of small quantities is still done by hand. The printed sheets are folded once, twice, thrice, or four times, according to the number of pages in the sheet. The simplest type of folding machine for ordinary bookwork makes three folds, and produces a folded signature or section of sixteen pages.

The most efficient of all book folding machines is the double quadruple (an American invention), which folds a sheet of one hundred twenty-eight pages, cutting it into four sections of thirty-two pages or eight sections of sixteen pages, each of which is delivered into a separate trough at speeds ranging from 20,000 to 40,000 sections per hour.

The folded signatures must next be gathered in complete books, either by hand or by gathering machines. Gathered books must next be *collated*—i.e. looked over to see that the sections are in their proper order.

**Stitching.**—Hand-sewing is done in frames across which are stretched, in a vertical position, the cords or tapes on which the book are to be sewn.



*Modern Semi-Automatic Book Sewing Machine.*

**Machine Sewing.**—In the modern machine bindery the automatically fed sewing machine is employed. The operator of this ma-

chine merely lays the signature or section onto a steel saddle, from which it is taken automatically into and through the sewing mechanism.

After sewing, the books have their edges trimmed (unless bound with uncut edges) on a cutting machine, the latest type of which trims all three edges at one operation.

The trimmed books are now glued on the back; when the glue is dry, they are ready for the next two operations, *viz.*, rounding the backs, a term which explains itself; and 'backing,' making the little projections at the side against which the cover opens as on a hinge. The next operation is the attaching of the headband, as the little decorative strip of cloth is called that finishes off the top and bottom edge of the book. This is followed by the gluing on of the crash and paper, which completes the operation of *lining-up* and leaves the book ready for casing, or attaching of cover.

In binding ordinary cloth books, the covers or 'cases' are made before they are attached to the books. Case-making is done in large binderies by machines. The latest type of this machine is fed from a roll of cloth, the machine glues the cloth, attaches boards and backlining paper, cuts off cloth and turns in the edges at a speed of thirty to forty covers per minute.

Modern cloth books must have the covers ornamented or stamped. This is generally accomplished by colored inks, gold, or silver. Inks are applied by the use of very heavy printing presses, but the metallic leafs are applied by the use of heavy stamping presses or embossers, which are equipped with electrically heated heads which keep the dies hot. The heat causes the leaf to stick to the cover wherever the hot die strikes. The loose leaf is then removed, leaving the impression of the die.

The book being now ready for its cover, and the cover being prepared for the book, there remains only the operation of pasting the two together. This is done in a Casing-in Machine, which automatically pastes both endsheets of the book and puts on the cover. The pasted books are then pressed in metal bound boards which press the books and make the groove or hinge. When the book is dry it is ready for inspection, jacketing, and delivery.

In the finest work, or when great strength is required, a leather cover is not completed separately from, but, as it were, built up round the book, and finished when attached to it. In recent years, however, leather bind-

ings have become so common that most of the leather covers are now made and finished separately like cloth cases. See LEATHER. A very large proportion of leather binding is done for Bibles and Prayer Books. 'Bible work,' and especially Prayer Books, give great scope to the binder for introducing round corners, pretty gold lines, and ornaments both inside and outside the cover, and tasteful linings of paper or leather for the inside of the covers.

For further reading on the subject of the binding of books, this bibliography is suggested: Klinefelter, L. M., *Bookbinding Made Easy* (1934); Grimm, F. W., *Primer to Bookbinding* (1939); Pratt, G. A., *Let's Bind a Book* (1940); Feipel, L. N., and Browning, E. W., *Library Binding Manual*.

**Book Clubs.** A term originally applied in this country to groups formed before the growth of circulating libraries for the purpose of buying and distributing among members the popular current books. More recently the idea was applied on a commercial scale with the formation of the Book-of-the-Month Club, the Literary Guild and similar organizations. Some of these groups buy bound books from the publishers at substantial reductions from the list price and distribute them by mail to subscribers; others buy the rights to a special edition and bind the books themselves. The book clubs met strenuous opposition from publishers and retail dealers early in their undertaking, but these differences were adjusted. At present there are many such clubs. For a complete account, see A. Growoll's *American Book Clubs, their Beginning and History* (1897).

**Book Collecting.** We read of book collecting in the very opening pages of history, as is told elsewhere. See LIBRARIES.

Petrarch collected books in many parts of Europe, and through his liberality in lending caused the loss of the only known copy of a treatise by Cicero which was awaiting transcription in his library. Magliabecchi, the jeweller's shop-boy, renowned for his knowledge of books, left 30,000 volumes at his death to the city of Florence, and his name to one of the noblest collections in the world. Matthias Corvinus, king of Hungary, collected the largest and finest library in Europe, afterward nearly all destroyed by the Turks. Birkheimer of Nuremberg had some MSS. that 'came to him out of the spoils of Hungary,' in which 'there is to be seen his head grav'd by Dürer, one of the first examples of sticking or pasting of heads, arms, or cyphers

into volumes,' says Oldys. Sir Thomas More was one of England's most learned book-collectors.

The names of royal collectors alone would fill a volume. Fascinating and inexhaustible as is the story of book collecting in the Old World, covering, as it does, centuries of time, the success attained by American collectors in less than one hundred years is really remarkable. Among noted collectors of the United States James Lenox was a pioneer; he secured for his country a copy of the Gutenberg Bible and many first folios of Shakespeare. Other important names in the field of collecting are John Carter Brown and John Nicholas Brown whose splendid collection is owned by Brown University; J. Pierpont Morgan; Henry E. Huntington, whose collection is housed in San Gabriel, Cal.; Robert Hoe; Edward Ayer; Henry C. Folger, famous for his Shakesperiana; and Harry Elkins Widener, with the most complete Stevensoniana in the world.

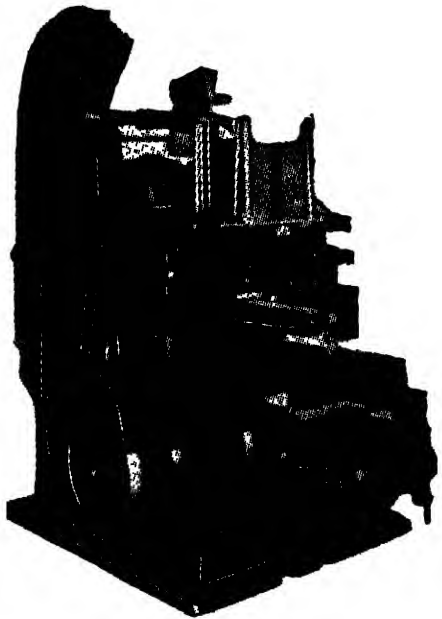
Each collector has his own hobby and collects generally on special and narrow lines. Books may be rare and yet sell for a low price. Others not so rare sought by many collectors at the same time fetch good prices. Shakespeare and Elizabethan and pre-Elizabethan authors are always a favorite field for collectors. Shelley, Burns, Dickens, Thackeray, Stevenson, Conrad and Kipling, occupy high positions, and in the American field Poe, Bret Harte, Mark Twain and Walt Whitman are favorites. Other fields in popular favor are Americana, which includes all works relating to America; first editions of modern authors; books illustrated by such artists as Phiz, Cruikshank, Kate Greenaway, Hugh Thomson and Beardsley; books on the Civil War; books on World War I, notably the Hoover collection at Stanford University; and books noted for typographical style and excellence.

**Bibliography.**—Carter, John, ed., *New Paths in Book Collecting* (1934); Rosenbach, A. S. W., *Book Hunter's Holiday* (1936); Witterich, J. T., and Randall, D. A., *A Primer of Book-collecting* (new ed. 1946); Muir, P. H., *Book-collecting as a Hobby* (1947); Storm, Colton, and Peckham, H. H., *Invitation to Book Collecting* (1947); Carter John, *Taste and Technique in Book-collecting* (1948); annual issues of Slater's *Book Prices Current* (London); *Am. Book Prices Current*.

**Bookkeeping**, a method of recording business transactions by means of figures. If a business enterprise operated by an individual

or group of individuals, is to succeed it must base its future plans and policies on facts. The facts most vital to a given business are: What is our present financial status or condition? How does this condition compare with our condition at some definite date in the past (usually one year ago)? What were the reasons for this change? What was our income and what were its sources? What were our costs of doing business? To answer these questions it will be necessary to have a record of all business transactions for the past period.

There are two systems of bookkeeping, the single-entry system and the double-entry system. In double-entry there is a complete record of every transaction, which requires



*New Style Casing-in Machine.*

that there be an entry of equal amount on both the debit and the credit sides of the ledger. Three books are used: a daybook, a journal, and a ledger. In the daybook is entered each transaction in order of date. It is the book of original entry. In the journal the names are transferred from the daybook and the entries are abridged and grouped. In the ledger is kept the summary of accounts as transferred from the journal and put under appropriate headings.

**Posting.**—After the records have been

made in the books of original entry the various debits and credits are transferred to their appropriate account in the ledger. Accounts with customers are often kept on cards or in a separate ledger. It is very important that the balance owed by a customer be available at a glance. This is accomplished by special ruling.

second column. If the posting has been done correctly the two columns will have the same totals which will indicate that the ledger is in balance, equal debits for equal credits. This form is called a *trial balance*. While it proves that there have been equal debits and credits posted, it does not prove that the original entries are correct. The trial balance also



*Modern Three-Knife Trimmer.*

**Trial Balance.**—After all posting has been completed the bookkeeper tests the accuracy of the posting by systematically listing all open accounts in the ledger. (An account is one which has one side larger than the other.) In listing the accounts a two-column form is used. Those with the debit side of the larger have the amount extended into the first column, and when the credit side is the larger the amount is extended into the

serves as a convenient summary of the ledger.

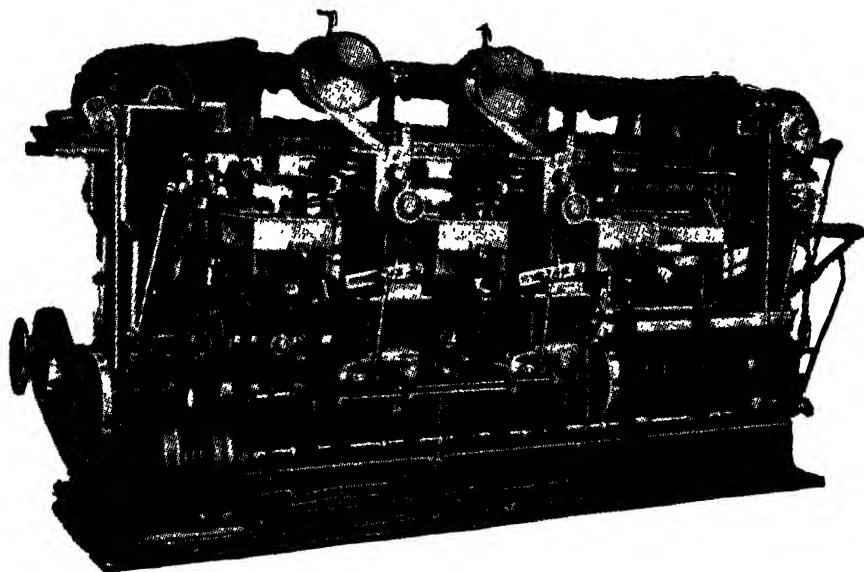
In Babylonia as early as 2285 B.C. drafts and checks were used and legal decisions were recorded covering receipts, inventories, sales and accounts. Records were made on tiny sun-baked slabs of clay written on front, back and sometimes on the edges. The early Egyptians kept their accounts on papyrus, while the Greeks required all the public officials to render an account of the funds en-

trusted to them. These records were engraved on stone and placed in public view. In early Rome we have the first evidence of the use of a book of original entry. Family heads, bankers and government officials recorded transactions on a memorandum form and later transferred them to a register.

One of the earliest references to account keeping in England is mentioned in connection with the story of the Domesday Book.

*Bookkeeping for Personal and Business Use* (1937); Rosenkampff, A. H., and Wallace, W. C., *Bookkeeping and Accounting* (4th ed. 1941); Carlson, P. A., and others, *20th Century Bookkeeping and Accounting* (1952).

**Book Lice**, a name applied to the insects of the family Atropidæ, also called lesser death-watches. They are tiny colorless insects often found inhabiting old books. See DEATH-WATCH.



*New Triple Lining and Head Banding Machine.*

Assessments of taxes were recorded on tally sticks which were notched sticks showing amount of taxes owed by each land owner. The same number and kind of notches were made on each end of the stick, after which it was cut into two parts; one to be retained by the treasurer and the other taken to the tax payer by a sheriff.

None of the earlier records were on the double-entry plan. However, in 1494 Luca Paciolo, an Italian monk, published a book entitled *Everything about Arithmetic, Geometry, and Proportion*, a chapter 'Reckonings and Writings' is devoted to double-entry bookkeeping. Paciolo says the object of bookkeeping is to give information about assets and liabilities. His system required three books—a memorial (memorandum book), a journal, and a ledger. Consult Cradit, K. V.,

**Bookmaker.** See Betting.

**Bookplates**, pictorial labels used to denote the ownership of books. Their use is said to be nearly as old as the printed book itself, but the earliest bookplate of which we have definite knowledge dates from about 1480. In the 15th century it became common, especially in Italy, to introduce the arms of the owner of a fine book into the illuminated border round the first page of text. The printing of separate labels to be pasted into a number of volumes began in Germany towards the close of the same century. Early in the 16th century the designing of bookplates engaged the attention of many German artists, notably Albrecht Dürer, Lucas Cranach, Jost Amman, and Hans Holbein. In France, Jean Bertaud de La Tour-Blanche used a bookplate as early as 1529. The first



English bookplate denoting personal ownership was that of Sir Thomas Tresham, which is dated June 29, 1585. Until the second half of the 17th century the use of bookplates was rare both in France and England. Towards the end of the century bookplates increased rapidly in England. When bookplates became fashionable, about 1880, armorial designs were largely supplemented by pictorial and emblematic ones. Until about the date just mentioned the collecting of bookplates was hardly known, but it sprang suddenly into favor. The first great collection in England was formed by Sir Wollaston Franks, numbered over 100,000 specimens, and was bequeathed by him to the Print Room of the British Museum.

The earliest bookplates used in America were brought over by some of the colonists or were made to their orders by English engravers. The first American bookplate bearing a date was the work of Nathaniel Hurd, of Boston. The early American plates are chiefly armorial in design; many printed labels, some ornamental in composition, were used. The publication of Mr. Warren's book in 1880 aroused a wide interest which culminated in the foundation of the Ex Libris Society, of London, in 1890. Bookplates usually bear inscriptions beginning with the words *Ex libris*, and these two words have been adopted as a convenient international name for the plates themselves. Consult H. W. Fincham and J. W. Brown's *A Bibliography of Bookplates*; J. Leicester Warren's *A Guide to the Study of Bookplates*; G. W. Fuller's *A Bibliography of Bookplate Literature* (1926).

**Books Burnt by Order.** Probably the most drastic holocaust of books burned by order that history records occurred in the year 221 B.C., when the Emperor Chi Wang-ti, of the Chinese dynasty of Tsin, desiring to destroy the power of tradition, caused to be burned all the books in his empire, except works on divination, agriculture, and medicine. The works of Pythagoras are said to have been burned at Athens. Antiochus Epiphanes ordered all copies of the Jewish Law to be burned. The introduction of the practice among Christians is ascribed to Osius, bishop of Cordova, who persuaded Constantine to order the writings of Arius to be committed to the flames. Bookburning was inaugurated in England by the destruction of copies of the Antwerp edition of Tynsdale's New Testament at St. Paul's in 1527.

In 1936, books hostile or believed hostile to the ideals of the Nazi regime, were publicly burned in various cities of Germany. Among the works cremated were those of Marx, Engels, Hegel, and Darwin.

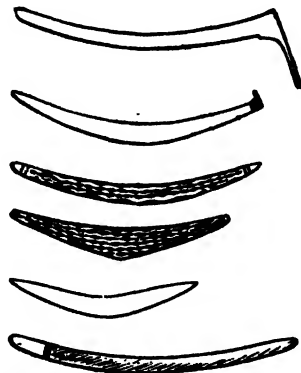
**Book Trade.** See **Publishing**.

**Bookworms**, the popular name given to several insects or their larvæ, which feed on the paste used in binding books, and bore holes both through the binding and through the pages of the book itself in order to get it.

**Boole, George** (1815-64), English mathematician and logician, was born in Lincoln. His most remarkable work was the *Laws of Thought* (1854), in which symbolic language and notation were employed to express purely logical processes.

**Boom**, a spar used to stretch the foot of a fore-and-aft sail. It pivots on the mast and its after-end is controlled by the sheet. See **SHIP**; **YACHT**. Also any spar projecting abeam to which the boats of a ship at moorings may be made fast, or the supports for the torpedo nets. Also the barrier of timbers, chains, or other material extended across the mouth of a harbor to prevent the entrance of hostile vessels.

**Boomerang**, a missile weapon of the Australian aborigines, which is a curved piece of hard wood, somewhat resembling a scimitar, about three feet long and three inches wide,



*Various Kinds of Boomerangs.*

flat on one side and slightly rounded on the other, with a sharp edge, but exhibiting variations in shape and dimensions according to locality. It is thrown with the convex or cutting edge pointing towards the object aimed at. Its great characteristic is that, if it encounters no heavy obstacle in its flight,

it begins, owing to its peculiar shape, a retrograde motion when its first force is spent, and thus returns to the place from which it has been thrown. It is a keen and deadly weapon, and usually inflicts a fatal wound.

**Boone, Daniel** (1734-1820), famous American pioneer, was born near the site of the present Reading, Pa. With his father he removed about 1752 to the North Carolina frontier, where he became a hunter and trapper, and in 1767 and again in 1769-71 roamed the forests of Kentucky, then an almost unknown region. In 1775 he had an important part in the founding of Boonesboro, Ky., named in his honor; and for many months in 1778 he was a captive in the hands of the Indians, who adopted him into their tribe. He escaped and about 1799 he received a grant from Spain in what is now Missouri; and until the acquisition of this territory by the United States, through the Louisiana Purchase in 1803, was a Spanish official.

**Booster**, a form of dynamo for raising the voltage of an outgoing current to compensate for the drop in a long feeder. See also ELECTRICITY, DISTRIBUTION OF.

**Boot, Torture of the.** The boot, used to extort confessions in Scottish judicial proceedings, was an iron or wooden frame in which the leg was enclosed. It seems to have been in frequent use towards the end of the 16th century, but was discontinued in 1690.

**Boötes**, an ancient constellation, supposed to represent the driver of the Wain, and sometimes called Arctophylax, the 'bear-keeper.'

**Booth, Agnes** (1846-1910), American actress, was born (Marion Agnes Rookes) in Sydney, New South Wales. Her first great success was with Edwin Forrest at Niblo's Theatre, New York, 1865. Mrs. Booth was the original Mrs. Ralston in *Jim the Penman*.

**Booth, Ballington** (1859-1940), Anglo-American evangelist, son of William Booth, founder of the Salvation Army, was born in Brighouse, England, and was sent by his father as commander of the Salvation Army to Australia (1885-7), and to the United States (1887-96). In 1896 he founded, on his own account, the Volunteers of America, a religious and charitable organization, of which he was commander-in-chief from the beginning. He wrote *From Ocean to Ocean* (1890). See also SALVATION ARMY; VOLUNTEERS OF AMERICA.

**Booth, Edwin Thomas** (1833-93), American actor, fourth son of Junius Brutus Booth, was born in Belair, near Baltimore,

Md. By accident or design, Junius Brutus Booth being unable to appear as Richard III. at a benefit in New York, Edwin was called upon to take the part when only seventeen, which he did creditably, at the same time making his first appearance in New York. He went on a tour to the South Sea Islands and Australia. Returning within a year to San Francisco, he acted in that city and neighborhood with varying success, returning to the East in 1856, and opening at Boston in April, 1857, as Sir Giles Overreach. The next month he appeared in New York, in *Richard III.* followed by a long list of principal parts, and for the first time establishing himself as a leading actor in that city. He married Mary Devlin, a charming young actress, in July, 1860. He was associated with the Winter Garden Theatre from 1862 until 1867, excepting the periods of retirement caused by the death of his wife and the assassination of Lincoln by his brother, John Wilkes Booth. During this connection he established himself as the leading actor of America, and, achieved a hundred-night run of *Hamlet*—an unprecedented feat at that time (1864). Booth then built his own theatre in New York, bearing his name, and opened it with *Romeo and Juliet* (February, 1869), Miss Mary McVicker, whom he shortly afterward married, playing Juliet to his Romeo.

In 1880 and 1882-3 Booth visited England and Germany, performing with Henry Irving in London, and receiving great honors from the German actors. He founded the club known as 'The Players' in New York, 1888, for the special benefit of actors, and in it are preserved his trophies and many memorabilia of his career. He lived there during the last four years of his life, and there he died in 1893. Consult Winter's *The Life and Art of Edwin Booth*, and Mrs. Grossman's, his daughter's *Recollections, etc.*; M. J. Moses' *Famous Actor Families in America*.

**Booth, Evangeline Cory** (1865-1950), born in England, daughter of Gen. William Booth, the founder of the Salvation Army. Field commander in London for five years; commander in Canada for nine years; commander-in-chief in U. S., 1904-1934; director of Salvation Army war work, 1914-1918. In 1934, she was chosen commander of the Salvation Army throughout the world. She resigned in 1939.

**Booth, James Curtis** (1810-88), American chemist, was born in Philadelphia, Pa. He was professor of applied chemistry at

Franklin Institute 1836-45, and in 1849 was appointed melter and refiner of the U. S. mint, holding the latter position for the remainder of his life, and being the first to introduce nickel as an alloy in the U. S. coinage.



Edwin Booth

**Booth, John Wilkes** (1839-65), American actor, son of Junius Brutus Booth and brother of Edwin Thomas Booth. He left the stage in 1863, and devoted himself to secessionist plots, the last of which resulted in his shooting President Lincoln at Ford's Theatre, Washington, on the night of April 14, 1865. He escaped into Virginia, but was surrounded at Bowling Green, where he had taken refuge in a barn, and was shot.

**Booth, Junius Brutus** (1796-1852), American actor, was born in London, England. His first London appearance was made at Covent Garden in 1815, in a minor part. Two years later he won success in leading parts, especially *Richard III.*, in the same city. In 1821 he sailed for America, which was thereafter his home. He opened at Richmond, Va., in *Richard III.*, and soon after performed in New York, rapidly winning appreciation from American audiences. In 1852 he visited San Francisco, and there played with his sons, Edwin and Junius Brutus, Jr., to crowded houses.

**Booth, Maud Ballington** (1865-1948), Anglo-American reformer, was born (Charlesworth) in Limsfield, England, of wealthy parentage. At the age of 17 she joined Miss Catherine Booth in Salvation Army work in Paris and Switzerland. In 1886 she married Ballington Booth and accompanied him to

the United States, where they engaged in reform and relief work in the Salvation Army, 1887-96, and after that time in the Volunteers of America. Mrs. Booth is best known through her prison work, which she has carried on in all the State prisons of the United States. During World War I she served with the A. E. F. in France.

**Booth, William** (1829-1912), English founder of the Salvation Army; b. in Nottingham. He joined the Methodist Church, and at the age of 17 began to preach. At 23 he was appointed to the charge of a Methodist Circuit in Lincolnshire. He soon resigned from the ministry and with his wife settled in London, erected a tent in the Whitechapel district, and began a series of meetings that resulted in the organization of the Salvation Army. His works include, *In Darkest England and the Way Out*; *Religion for Every Day*; *Visions*. Consult Railton's *The Authoritative Life of General William Booth* (1912); Regbie's *Life of General William Booth* (1920).

**Booth, (William) Bramwell** (1856-1929), general of the Salvation Army, b. Halifax, England; in 1874 began his public work, was chief of staff, 1880-1912.

**Boothe, Clare** (1903- ), American playwright, b. N. Y. C.; married George T. Brokaw (div. 1929), Henry R. Luce, 1935. Wrote *The Women* (1937); *Kiss the Boys Goodbye* (1938); *Margin for Error* (1939). Member U. S. House of Representatives, 1943-47; U. S. Ambassador to Italy, 1953- .

**Boothia Felix**, (named after Sir Felix Booth), a peninsula (area 13,100 sq. m.) whose promontory, Murchison Point, is the most northerly part of the mainland of North America. The Gulf of Boothia lies to the east, separating Boothia from Cockburn Island and Melville Peninsula.

**Booth-Tucker, Emma Moss** (1860-1903), daughter of William Booth, was born in Gateshead, England. She managed the international homes of the Salvation Army from 1880 until her marriage in 1888 to Frederick Tucker. With her husband she went to India afterward to London, and thence to the United States in 1896.

**Booth-Tucker, Frederick St. George de Lateur** (1853-1929), Anglo-American evangelist, was born in Monghyr, Bengal, India. He held several positions in the Indian civil service but resigned in 1881 to join the Salvation Army. He established its organization in India (1882), and conducted it there until 1891, when he went to London to take up the work of International Secretary. In

1888 he married Emma Booth, daughter of the founder, adding the name Booth to his own. On the resignation of Ballington Booth, in 1896, he was made commander of The Salvation Army in the United States.

**Booty**, in a military sense, the plunder taken from a vanquished people by the victorious enemy.

**Bopp, Franz** (1791-1867), German philologist, was born in Mainz. In his great work, *Ueber das Conjugationssystem der Sanskritsprache* (1816), he endeavored to trace a common origin for the grammar of Sanskrit and the Aryan family of languages, and thus introduced a new era in linguistic study.

**Bora**, the sharp, cold, dry northeast wind blowing in fierce gusts (up to 130 m. an hr.) along the coast of Dalmatia, from Albania in the south as far north as Trieste.

**Bora, Bohra, or Bohren, Katharina von** (1499-1552), wife of Martin Luther. The daughter of a German gentleman, she entered a convent at Nimbschen, near Grimma, Saxony, while a young girl. After a perusal of Luther's work, she decided, with eight of her companions, to embrace the principles of the Reformation. With the assistance of the reformer, the nuns made their escape from the convent (1523), and Katharina was placed under the care of the burgomaster of Wittenberg until her marriage with Luther two years later.

**Boracic (Boric) Acid** ( $H_2BO_3$ ), a weak acid obtained chiefly by the action of sulphuric acid on a concentrated solution of borax, or by the recrystallization of native boracic acid. The latter occurs in the Tuscan lagoons of Italy, in the neighborhood of Monte Rotondo, Lago Zolforeo, Lardello, and Sasso. Around the fissures (*suffoni*) in the rocks of this mountainous region, from which steam impregnated with boracic acid escape, basins of masonry are built and filled with water; these serve to condense the steam and dissolve the boracic acid. The basins discharge into a central reservoir, where time is allowed for the subsidence of mechanical impurities, after which the solution is concentrated, whereby the boracic acid crystallizes out. Boracic acid forms transparent colorless scales which yield a soft white powder of faintly bitter taste, soluble in 18 parts of cold water, 3 parts of boiling water, and 4 parts of glycerin. Boracic acid is poisonous to lower forms of life; but its antiseptic action is too feeble to be depended on against pathogenic germs. Aqueous solutions are soothing and detergent, free from irritating action, and are

used as a local application in inflammatory conditions of the mucous membrane, conjunctivitis, ulceration of the mouth. In the dry form, powdered boracic acid is frequently used as an antiseptic in dusting powder, talcum, mixtures. It is also extensively employed in making glazes for earthenware and enamelware. See BORAX.

**Borage**, a genus of plants belonging to the order Boraginaceæ. It is a somewhat coarse annual, hairy in character with large leaves and beautiful blue flowers.

**Borah, William Edgar** (1865-1940), American Senator, was born in Fairfield, Ill. He was educated in public schools and at the University of Kansas, was admitted to the bar in 1889, practiced law in Lyons, Kans., and in 1890 went to Boise, Ida., where he followed his profession until elected U. S. Senator from Idaho for the term of 1907-13. He has been five times reelected. Mr. Borah is rated as a progressive if not actually a radical in politics. He was one of the leading Senators opposed to the entry of the United States into the League of Nations and was active in securing ratification of the Kellogg-Briand Peace Pact, 1929. He was deeply interested in securing recognition by the U. S. of Soviet Russia. Mr. Borah declined nomination as Vice-President on the Republican ticket in 1924, preferring to remain in the Senate, where he was the senior member and chairman of the Foreign Relations Committee, a post he relinquished in 1932. In 1939 he led the losing fight for an embargo on munitions to warring nations.

**Borax** (Sodium Pyro- or Tetra-Borate,  $Na_2B_4O_7 \cdot 10H_2O$ ) is found in a native, impure state (called *Tincal*) in lake beds in Tibet, India, Persia, Peru, Ecuador, California, and Nevada. The chief sources of supply for the United States are the colmanite deposits in Calico and Death Valley, California, and the deposits in Clark co., Nevada. These latter deposits were discovered in 1921 and constitute the largest known deposit of borax. Borax forms transparent monoclinic prisms or a white powder, inodorous, of a sweetish, alkaline taste. It effloresces slightly in dry air. It is soluble in 17 parts of cold water, 0.5 part of boiling water, and 1 part of glycerin at  $176^\circ F$ . Borax is used as a cleansing agent on account of its unequalled detergent properties; also, like boracic acid, in making glazes for pottery, porcelain, and agateware. Medically, borax possesses only moderate antiseptic powers. See BORACIC ACID.

**Borchgrevink, Carsten Egeburg** (1864-

1934), Antarctic explorer, born in Christiania, Norway. He was one of the first to land on the Antarctic continent, Jan. 23, 1895. In August, 1898, he commanded the Southern Cross expedition, organized by Sir George Newnes, reaching latitude  $78^{\circ} 50' S.$ —40 m. nearer the South Pole than the previous record by Ross. See ANTARCTIC.

**Borda, Jean Charles de** (1733-99), French mathematician, astronomer, and naval designer, was born in Dax, France. He was engaged in the measurements preliminary to the introduction of the metric system of weights and measures, and was member of a commission for the measurement of a meridional degree. He improved the reflecting circle, writing of his invention in *Description et Usage du Cercle à Réflexion* (1778).

**Bordeaux**, city, capital of the department of Gironde, France, on the Garonne River; the fourth seaport of France, with a fine harbor, greatly improved since the World War. Features of interest are the Roman amphitheatre, the Church of St. Croix, and the Gothic Cathedral of St. André. The detached bell tower of St. Michael's (354 ft. high) is the loftiest spire in Southern France. Besides a university (see BORDEAUX, UNIVERSITY OF), the city has a school for hydrography and navigation (1631). The wines of Bordeaux, both red and white, famed since the 4th century, are of the first importance. Shipbuilding is also one of the larger industries. Bordeaux sends a fishing fleet annually to the cod fisheries of Newfoundland and Iceland. The annual value of the combined exports and imports is about \$150,000,000, wine and brandy forming about one-third of the exports; p. 253,751.

**Bordeaux, University of**, was founded in 1441. In 1808 its organization was reformed under Napolcon. The University has over 2,500 students.

**Borden, Right Hon. Sir Robert Laird** (1854-1937), Canadian statesman, born Grand Pré, Nova Scotia. He became Prime Minister of Canada upon the resignation of the Laurier Government, Oct. 10, 1911. He was the first overseas minister to be summoned to a meeting of the British Cabinet (July 14, 1915). He represented Canada on the Imperial War Cabinet of 1917, and formed a Coalition Cabinet, composed about equally of Conservatives and Liberals, in which he himself was Premier and Secretary of State.

**Bordereau**, French word meaning invoice, account, or memorandum. It came into

prominence in connection with the Dreyfus affair in 1894. See DREYFUS AFFAIR.

**Borders**, **The**, the name associated in history, poetry, and literature with the district lying on either side of the Cheviot Hills, which form in great part the dividing line between England and Scotland. On the English side are Cumberland and Northumberland; on the Scottish Berwickshire, Roxburghshire, and Dumfriesshire. Toward the close of the 13th century the Scottish campaigns of Edward I. provoked a state of perpetual warfare on the Borders, which continued with comparatively short intervals of peace down to the union of the crowns. Plundering raids were constantly made from one side or the other through the Cheviot passes and along the valleys and streams, the details of which are immortalized in the romantic Border ballads. Consult Skene's *Celtic Scotland*; Rhys' *Celtic Britain*; Wilson's *Tales of the Borders*; Lang's *Sir Walter Scott and the Border Minstrelsy* (1910).

**Bordone, Paris** (1500-71), Italian painter of the Venetian school, pupil of Titian. His chief work, *Fisherman Giving St. Mark's Ring to the Doge*, Venice Academy, is a fine pageant picture.

**Boreas**, the north, or more strictly the north-northeast wind, the coldest in Greece. In ancient legend, Boreas was the brother of Hesperus, Zephyrus, and Notus.

**Borelli, Giovanni Alfonso** (1608-79), Italian physician and mathematician. He was one of the first to describe the path of comets as a parabola, and was also the founder of the iatrophysical school, which attempted to apply mathematics to medicine, as in his *De Motu Animalium* (1680-1).

**Borers**, wood-boring beetles which feed upon wood, into which they burrow. The most familiar and destructive are the ambrosia beetles, death-watch, and the bark beetles.

**Borghese**, a powerful Italian family which had its origin in Siena. (1.) CAMILLO, born at Rome; created cardinal (1596), Pope Paul v. (1605-21); did much to beautify Rome, and added largely to the Villa Borghese. (2.) CAMILLO FILIPPO LUDOVICO BORGHESI (1775-1832), who served (1796-1815) in the French army, and married the sister of Napoleon Bonaparte. He sold to Napoleon the museum of the Borghese Villa.

**Borghese Villa**, at Rome, until 1902 the summer residence of the Borghese, containing an art gallery. It was sold in 1902 to the Italian state for about \$1,300,000.

**Borghese Palace**, in Rome, the town residence of the Borghese. The picture gallery still contains nearly six hundred paintings, all of first-rate importance.

**Borghesi, Bartolommeo, Count** (1781-1860), Italian archaeologist and numismatist, born at Savignano; catalogued the Vatican collection of coins.

**Borgia, Cesare** (1478-1507), was the son of Rodrigo de Borja, a Spanish noble, who afterward became, 1492, Pope Alexander VI. Cesare was made by his father archbishop of Valencia, and afterward, 1493, cardinal. The Borgias waged a war of extermination against other baronial families of the Roman state. In June, 1497, his brother, Giovanni Borgia, Duke of Gandia, was murdered, and his body thrown into the Tiber—the crime being instigated, it was said, 1498, by Cesare, though historically it has not been proved. Immediately after this Cesare threw off the priesthood and resigned his cardinalate. Proceeding on a diplomatic mission to France, he was made Duke of Valentinois by Louis XIII., and in May, 1499, he married Charlotte, sister of Jean d'Albert, king of Navarre. With French assistance Cesare now assailed the towns of Romagna. In a succession of campaigns he tried to make himself master of all Italy, but his forces were finally defeated by a coalition of his enemies.

Cesare Borgia was a man of ungovernable passions, and reckless of human life in the pursuit of his ends. With a towering ambition he trampled on all laws, human and divine; yet he was an able administrator, and a patron of art, befriending Pinturicchio and Leonardo da Vinci. Machiavelli's notorious *Il Principe* (1535) was modelled upon Cesare Borgia.

**Borgia, Lucrezia** (1478 or 1480-1519), only sister of the preceding, was born at Rome. She was married three times, apparently to satisfy the family ambition for power. She was an active patroness of literature, and though she was represented as the sharer with Cesare in all the crime, vice, and licentiousness of the time, nothing is alleged against her after she became duchess of Ferrara.

**Borglum, John Gutzon de la Mothe** (1867-1941), sculptor and painter, born in Idaho. He was sculptor for the Cathedral of St. John the Divine (P.E.), designed and partly executed the Stone Mountain (Georgia) memorial to the Confederacy, and the Black Hills (South Dakota) memorial dedicated by President Coolidge in 1927.

**Bori, Lucrezia** (1888- ), Spanish-American lyric soprano, born in Valencia, Spain. Her debut was made at 20 in Carmen at Rome, Italy. After singing in Europe, South America and Cuba she came to the United States, in 1912, joining the Metropolitan Opera Company. In 1936, at the peak of her popularity, she left the stage.

**Boris III** (1894-1943), King of the Bulgarians from his father's abdication, 1918. He served in the first Balkan War (1912), in World War I on the side of Germany, and led Bulgaria into World War II as an ally of Germany. He died mysteriously, and was succeeded by his six-year-old son, Simeon.

**Boris Godunov** (1551-1605), Czar of Russia from 1598 to 1605, was of Tartar origin. Appointed by Ivan IV. to assist his young son, Czar Theodore I. (1584-98)—who in 1580 married Boris's sister—Boris soon became the real ruler of the country. During this time he made the Russian Church independent of the patriarch of Constantinople by creating the first Russian patriarchate at Moscow; he won over the nobles by the famous ukase of 1597, by which he virtually converted the peasants into feudal serfs; he completed the conquest and fostered the colonization of Siberia; he secured the country against invasion of the Tartars. As Czar from 1598 on Boris endeavored to attract into the country foreign savants and artisans, and even planned to found a university at Moscow. His life forms the subject of dramas by Pushkin (1831) and Count Alexis Tolstoy (d. 1876).

**Borjesson, Johan** (1790-1866), Swedish dramatist and poet, was born in Tanum. He first became famous as a lyric poet, then as a dramatist with his *Erik XIV.* (1846).

**Borlase, William** (1695-1773), English antiquary and correspondent of Pope. His most important works are *Antiquities of Cornwall* (1753), and *Natural History of Cornwall* (1758).

**Bormio**, health resort, Italy, famous for its hot mineral waters, which were used by the Romans.

**Börne, Ludwig** (1786-1837), German author. In 1830 he went to Paris, where he and Heine became known as the foremost leaders of 'Young Germany.'

**Borneo**, island of the Malay Archipelago, after Australia, Greenland and New Guinea, the largest island on the globe. It is divided politically between the Netherlands and Great Britain, which has also protectorates over Brunei and Sarawak. British Borneo and

Dutch Borneo are separated by a great mountain barrier. The island is about 690 m. long by 605 m. wide, and has an area of from 263,000 to 300,000 sq. m. The coasts, except in the north, are low-lying and irregular. A series of four mountain ranges radiate north-east and southeast from a common centre in the southwest. The mountains and forests contain many monkeys, among which is the orang-outang. Tapirs, a small kind of tiger, small Malay bears, swine, wild oxen or banteng, and various kinds of deer abound. The few domesticated animals are buffaloes, sheep, goats, dogs, and cats. Among the birds are eagles, vultures, Argus-pheasants, peacocks, flamingos, pigeons, parrots, and the swallows which construct the edible nests prized by the Chinese for making soup. The rivers, lakes, and lagoons swarm with crocodiles, and many kinds of snakes, frogs, and lizards, and the coasts are rich in tortoises, pearl-mussels, oysters and trepang.

Minerals abound, notably gold, platinum, and silver. There are also rich oil-wells particularly in Dutch Borneo.

Borneo is traversed by several large rivers, of which the most important are the Kapuas, the Kinabatangan, and Barito. In the interior are primeval forests yielding valuable timbers (teak, ebony, sandal-wood), gums and resins, rubber, gutta-percha, and camphor, rattans, fibres, benzoin, spices (cloves, pepper, camphor, etc.), and magnificent flowers (orchids, pitcher plants and rhododendrons). The climate is hot and humid.

The population is estimated at about 3,920,000. It consists of three classes: the Dayaks or Dyaks, who are the aboriginal heathen inhabitants, and constitute the great bulk of the population; the Mohammedans or 'Malays,' and the Chinese.

Borneo was discovered by Lorenzo de Gomez in 1518. The Portuguese first opened up commerce, and were followed by the Spaniards. Early in the 17th century the Dutch established themselves in South Borneo. The English soon followed. Borneo was occupied by the Japanese 1942-45.

Consult Keith, A. N., *The Land Below the Wind* (1939) and *Three Came Home* (1947) and *The White Man Returns* (1951).

**Bornholm**, a Danish island in the Baltic, about 25 miles from the southern point of Sweden. Kaolin and other fine clays, in which the island abounds, originate the chief industries. During the Viking and early Middle Ages it was one of the principal trade centres in the Baltic; p. 47,988.

**Borodin, Alexander Porfiryevich** (1834-1887), Russian musical composer, born in Leningrad. His work includes symphonies, an opera, complete after his death, and string quartets and songs.

**Borodin, Michael**, Russian Soviet leader, at one time adviser of the Canton government and representative at Peiping (1925-1928), reputed to be influential in Soviet policies from 1930 on.

**Borodino**, vil., Moscow gov., Russia, celebrated for Napoleon's victory over the Russians under Kutusoff in 1812.

**Bororo**, a S. American people who occupy a vast domain of about 270,000 sq. m. in the Brazilian states of Matto Grosso and Goyaz. They are a tall race.

**Borough English**. An ancient English tenure in which lands descend not to the oldest son, as is the rule of the common law, but to the youngest.

**Borromeo, Carlo, Count** (1538-84), cardinal and archbishop of Milan, was born at Arona, on Lago Maggiore. As archbishop of Milan Borromeo visited all parts of his diocese, reforming abuses, and establishing colleges, schools, and asylums for destitute children. He founded (1570) the Helvetic College at Milan. It was through Borromeo that the Golden League—an alliance of the seven Catholic Swiss cantons—was founded for the united defense of the faith. Borromeo was canonized in 1610 by Pope Paul v.

**Borrow, George Henry** (1803-81), English philologist, traveller, and author, was born at East Dereham, Norfolk. Borrow's life is sketched in a romantic spirit, with the suppression of real names and places, in *Lavengro* and *The Romany Rye*. His boyhood was spent wandering with the colors; and voluntary studies in French, Italian, and Spanish, as well as the lore of boxers, horse-coupers, and gypsies, supplemented a scanty education picked up at the High School, Edinburgh, and Norwich Grammar School, and elsewhere. In 1825 came the famous ramble through England, immortalized in *Lavengro*. His travels also include visits to Russia, Portugal and Spain. In 1840 he began the literary period of his career with *The Gypsies in Spain*. This was followed by *The Bible in Spain* (1843); *Lavengro* (1851); *The Romany Rye* (1857); *Wild Wales* (1862).

**Bortnyanski, Dmitri Stepanovitch** (1751-1825), Russian composer of church music, and director of the Imperial Capella; but is distinguished primarily for his religious

compositions which marked an epoch in Russian musical history.

**Borzoi**, or **Russian Wolf-Hound**, a hound of the general size and shape of the greyhound, but having a long silky and somewhat curly white coat, sometimes spotted with black or tan.

**Boscan-Almogaver**, **Juan** (c. 1495-1542), Spanish poet, was born in Barcelona; became tutor (1520-6) to the great Duke of Alba. His earlier compositions are in the old Castilian measures, but he was induced by the Venetian ambassador Navagiero to adopt the Italian hendecasyllabic metre in 1526, and was mainly instrumental in changing the fashion of Spanish verse.

**Boscobel**, parish, England, in Shropshire, famous as containing the farmhouse where Charles II. hid after his defeat (1651) by Cromwell at Worcester. The Royal Oak in whose branches the king concealed himself for 24 hours no longer stands, but a tree said to have been grown from one of its acorns commemorates the event.

**Boscovich**, **Ruggiero Giuseppe**, or **Roger Joseph** (1711-87), Italian mathematician and astronomer; entered the Jesuit order in 1725, and was commissioned by the Pope to measure a degree of the meridian in the Papal States. His chief works are *Opera Pertinentia ad Opticam et Astronomicam* (5 vols. 1785), and a long Latin poem, *De Solis ac Lunæ Defectibus* (1764).

**Bosio**, **François Joseph**, **Baron** (1769-1845), French sculptor, was born in Monaco; executed bas-reliefs for the column in the Place Vendôme at Napoleon's request; was made royal sculptor by Louis XVIII; and was created baron by Charles X. His best-known works are *Cupid Darting Arrows* (1808); *Henry IV. as a Child*; *Aristée*.

**Bosna Sara**. See **Sarajevo**.

**Bosnia-Herzegovina**, district of Yugoslavia, including the provinces of Bosnia and Herzegovina, formerly provinces of Turkey, and from 1908 until World War I, of Austria-Hungary. It is situated in the northwestern part of the Balkan peninsula, bounded on the north by Croatia and the river Save, on the east by Serbia and Montenegro, and on the south and west by Dalmatia and the Adriatic. It has an area of 19,768 sq. m. In general it is mountainous and picturesque. Bosnia-Herzegovina is rich in natural resources; minerals, including coal, iron, copper, silver, lead, salt, and manganese occur abundantly in the mountains, and forests of fir, pine, oak,

and beech cover the central part. Agriculture is the leading industry; live-stock raising is important, and the rivers are full of fish. The valleys are extremely fertile, and cereals, fruits of all kinds, vegetables, dairy products, and tobacco are produced. For administrative purposes Bosnia-Herzegovina is divided into 6 districts named for the important towns, all but one of which are in Bosnia. The people are mostly of Serbian blood; about two-thirds of them are Christians, the rest Mohammedans; p. 2,679,000.

After forming successively part of Illyria, Pannonia, Dalmatia, Serbia, and Croatia, Bosnia and Herzegovina were subjugated by the Turkish sultan Mohammed II. In 1849-50 and in 1875 the peasantry, who mostly clung to their Roman Catholic faith, rose in revolt against their masters (countrymen of their own whose ancestors accepted Mohammedanism in order to retain their estates) and against their Turkish rulers. In 1878 the Berlin Congress gave Austria a mandate to occupy and administer Bosnia, Herzegovina, and the sanjak of Novi-Bazar, under the suzerainty of Turkey, and in 1908 Austria annexed all three. In 1914 the assassination of Archduke Ferdinand in Sarajevo, the capital, precipitated World War I, at the close of which the provinces of Bosnia and Herzegovina were allotted to the newly formed state of Yugoslavia (1918); overrun by Germans 1941 to 1944. Consult Munro's *Rambles and Studies in Bosnia-Herzegovina*; British Foreign Office *Handbook No. 12* (1920); Stoianovitch's *Bosni-Herzegovina* (1917).

**Bosporus**, (also **Bosphorus**), or **Straits of Constantinople**, strait, Turkey, separating Europe from Asia, and connecting the Black Sea with the Sea of Marmora. Its length is 17 m., and its breadth is from 1 to 2 miles.

**Bosruck**, Alpine tunnel of Austria, on the Pyhrn Railway, affords direct communication between Bohemia and the Adriatic.

**Boss Rule**. In our present usage of the terms, the 'boss' differs from the political 'leader' in that the latter keeps ever foremost the highest welfare of the country, and uses only methods that will be morally helpful to the voters; while the boss advances primarily his own power by serving special interests—frequently by methods that are considered immoral and corrupting to the voters.

Consult Macy's *Political Parties in the United States* (1900); Goodnow's *Municipal Government* (1909); F. R. Kent's *Great*



*Game of Politics*; Herbert Asbury's *Gangs of New York*; Allen's *Our Fair City* (1946).

**Bossuet, Jacques Bénigne** (1627-1704), French preacher, historian, and controversial writer, was born in Dijon. In 1688 he published *L'Histoire des Variations des Eglises Protestantes*, and in 1694 *Maximes et Réflexions sur la Comédie*, in which he attacked the theatre, and especially the plays of Molière. From 1697 to 1701 he carried on negotiations with Leibniz to bring about a union of the Catholics and Lutherans, but without success. A man of fervent piety and generous emotions, in theology and politics Bossuet was rigorously orthodox and conservative. Bossuet's Complete Works were issued in 1815-19 and in 1862-6. His *Œuvres Oratoires* were published in 1890-96, and his *Oraisons Funèbres* in 1908 (in Dent's *Les Classiques Français*). Consult Floquet's *Etudes sur la Vie de Bossuet*; Lanson's *Bossuet*; Rabelliau's *Bossuet*.

**Boston**, the capital and largest city of Massachusetts, one of the most historically significant and commercially important cities of the United States, is situated at the head of Massachusetts Bay, Suffolk co. It comprises several former cities and towns about Boston Harbor and along the Charles River, and includes Old Boston, or Boston proper. The city's shipping facilities are enhanced by deep-water freight terminals and wharves, permitting rapid and convenient transfer to and from railways and ships. In 1911 the Massachusetts legislature appropriated \$2,500,000 for developing the port of Boston. The first improvement was the remodeling of the Commonwealth Docks to accommodate the Hamburg-American steamship lines passenger service. A further appropriation of \$3,000,000 was made to build a large dry dock capable of accommodating steamers of great size, and further to develop the port according to a consistent scheme. This dry dock was completed in 1919 and was formally taken over by the U. S. Navy, Dec. 22. The city is connected by ocean steamship lines with Liverpool, London, Hamburg, Glasgow, the chief Mediterranean ports, and the West Indies. Domestic lines run to the leading ports of the New England and Southern coasts and to Nova Scotia and New Brunswick.

The climate is fairly equable; winters are cold and summers are generally hot, but tempered by the winds from the Atlantic. The old part of the city has narrow, crooked, poorly planned and poorly graded streets, but the modern city has nearly 600 miles of paved

streets and the Back Bay district is handsomely laid out. The subway, opened in 1897 and since extended—the first public work of its kind built and owned by an American city—has greatly relieved excessive traffic pressure in the crowded business quarters. The Metropolitan Water System is distinguished by the Wachusett Lake reservoir, on the Nashua River, the largest freshwater reservoir in the world. The park system of Boston covers over 2,300 acres. The most noteworthy is Boston Common (48 acres), which has been dedicated to public purposes since 1634. Immediately adjacent is the fine Public Garden (24 acres), reclaimed from what was once low-lying wet land. There are numerous other parks and playgrounds in the city system. A noteworthy feature is the Boston Metropolitan Park System, including a chain of parks reaching from the Back Bay Fens up through the West Roxbury district and along Dorchester Bay to South Boston. Beautiful parkways form uniting threads, and along the Boston side of the Charles River there is an embankment laid out with boulevards and pleasure grounds. (See PUBLIC PARKS.) The beauty of the parks, squares, and public buildings is enhanced by monuments and statues.

Boston contains an unusually large number of public buildings, many of which are of historic interest. The State House, a fine edifice with an imposing front and surmounted by a gilded dome, the County Court House, the Federal Government Building, the City Hall, and the Custom House are handsome structures in varied styles of architecture. Grouped around Copley Square are Trinity Church, one of best examples of Romanesque architecture in the United States and the Boston Public Library (see LIBRARIES). The Museum of Fine Arts, opened to the public in 1909, is situated on the Fenway.

Other notable edifices are the Exchange Building, Tremont Temple, the Museum of Natural History, the Boston Athenæum, Symphony Hall, Horticultural Hall, the buildings of the Massachusetts Historical Society, and the marble building of the Harvard Medical School, Faneuil Hall (see FANEUIL, PETER), originally built in 1742, under whose roof public meetings and discussions of vital moment were held previous to and during the Revolution and later, is historically of note; as are the famous Old South Meeting House (1729), the rendezvous from which the Boston Tea Party (q.v.) started on its mission; the old State House (1748), whose

original appearance has been preserved; the Old North Church (1723); King's Chapel (1754).

As an educational and literary centre Boston occupies a high position. As a seat of learning it may justly claim the prestige of Harvard University (q.v.), and the Massachusetts Institute of Technology (q.v.), the greater part of whose schools are in the adjoining city of Cambridge and the remainder in Boston. Among other institutions of higher education are Boston University (q.v.), Boston College (Jesuit, 1860); the Medical and Dental Schools of Tufts College (q.v.); the New England Conservatory of Music (1870).

Among the many churches perhaps the most interesting architecturally are the Park Street Church (Congregational), King's Chapel (Unitarian), and the Old South (Congregational). Charitable institutions include the splendidly equipped Massachusetts General Hospital, the Children's Hospital, the Peter Bent Brigham, Robert Bent Brigham, Psychopathic, and City Hospitals. In musical art Boston ranks high (see BOSTON SYMPHONY ORCHESTRA).

Boston has a large trade in wool. The factory products include boots and shoes, men's clothing, confectionery sugar, cotton manufactures, foundry and machine-shop products, women's clothing, tobacco manufactures, druggists' compounds, musical instruments, electrical machinery, and leather. Boston also occupies a prominent position as a book-publishing centre; p. 801,444 (city); for Greater Boston (metropolitan area), 2,600,000.

Old Boston, or Boston proper, was first settled by a number of colonists who came with John Winthrop from Salem in 1630, and went to Charlestown, but who soon afterward moved to the peninsula which was the original site of the old city. This peninsula, named Shawmut, or Sweet Waters, by the Indians, had been occupied by Rev. William Blackstone, an Anglican clergyman; but he sold his rights to the settlers four years after they had established themselves. The place was then named Boston after Boston in Lincolnshire, England.

Fierce persecutions and vexatious religious controversies marred the early life of the town. In the meantime a post office, a printing houses, a mint, and a bank had been established; and at the beginning of the 18th century, its increased growth and the founding of the first American newspaper, the

Boston News Letter (1704), gave the town a leading position and a larger political life. The independent spirit became more fixed and hostile after the Boston Massacre (q.v.), March 5, 1770, while the Boston Tea Party (q.v.) of 1773 was a decided defiance of the British government. The inhabitants were among the first in active duty on the outbreak of the Revolution; the Battle of Bunker Hill (q.v.) was fought on June 17, 1775. After a long siege the British were compelled by Washington to evacuate the town in March, 1776. (See REVOLUTION, AMERICAN.)

Henceforth the only serious interruption to Boston's business growth was the Civil War. In 1907 a commission of seven was appointed by Mayor Hibbard to devise a practical working form of government for the city. In 1909 the legislature adopted this new charter. The mayor is elected for four years but may be recalled at the end of the second year. His appointments do not require city council confirmation, but may be rejected by the State Civil Service Commission.

The strike of the Boston police in September, 1919, left the city at the mercy of criminals. Governor Calvin Coolidge (q.v.) treated the strikers as mutinous, and quickly suppressed the strike.

Dedham, near Boston, in 1927, saw trial of Nicola Sacco and Bartolemeo Vanzetti, accused of the murder of a factory paymaster at South Braintree, Mass., during a holdup. Liberals throughout the world interested themselves in the case and condemned the verdict. In recent years the city has gained some notoriety through activities of its drama and book censorship. Boston and vicinity lost many old elms in the New England hurricane of September 21, 1938.

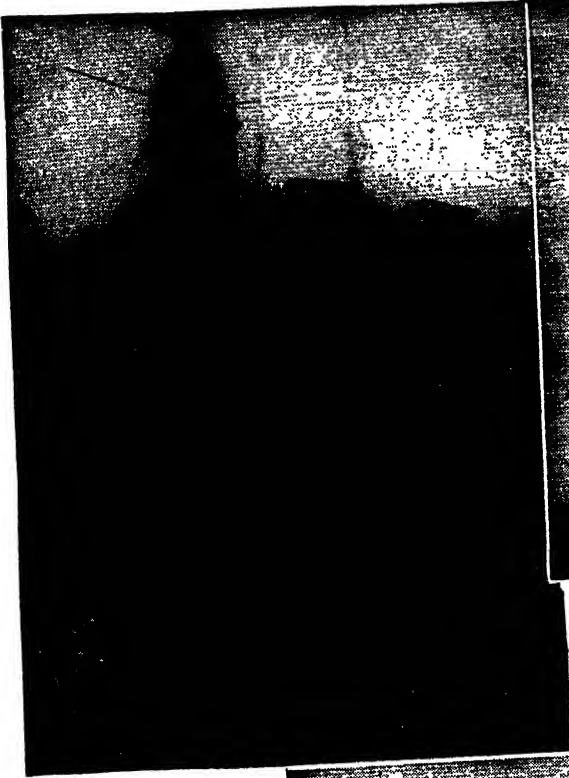
**Bibliography.**—Howe, M. A., *Boston Landmarks* (1946); Amory, Cleveland, *The Proper Bostonians* (1947); Forbes, Esther, *The Boston Book* (1947); Jennings, J. E., *Boston, Cradle of Liberty, 1630-1776* (1947).

**Boston**, seaport, England. Its most noteworthy feature is the Church of St. Botolph (Boston—Botolph's town); p. 24453.

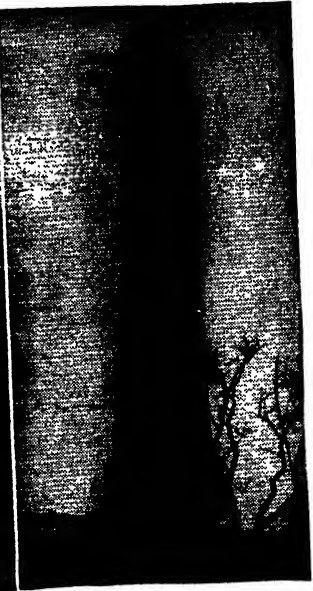
**Boston College**, a Roman Catholic educational institution in Boston, Mass., founded in 1864, and conducted by the Fathers of the Society of Jesus.

**Boston Massacre**, a riot which occurred in Boston on March 5, 1770, the culmination of a series of disturbances due to the quartering of British soldiers in that city.

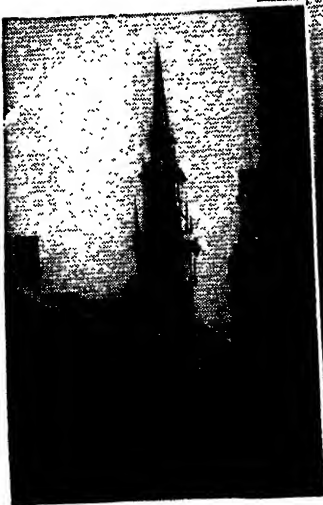
**Boston Port Bill**, a bill passed by the



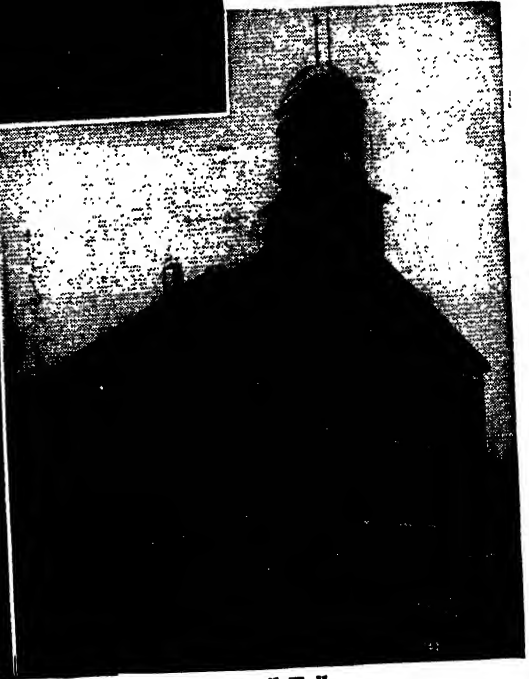
*Old State House.*



*Bunker Hill Monument.*



*Old North Church.*



*Faneuil Hall.*

*Views in Boston.*

British Parliament on March 31, 1774, providing for the shutting up of the port of Boston, Mass., and the removal of the seat of government to Salem. The bill was introduced by Lord North in retaliation for the events of the Boston Tea Party (q.v.).

**Boston Symphony Orchestra**, of Boston, Massachusetts, was founded in the year 1881 by Henry Lee Higginson. It is ranked by very high musical standards as one of the best orchestras in the United States.

**Boston Tea Party**, an incident occurring in the United States just previous to the American Revolution. As a practical protest against the principle of 'taxation without representation,' a party of Bostonians, disguised as Indians, boarded three ships laden with taxed tea, and threw 350 chests into Boston Harbor (Dec. 16, 1773).

**Boston University**, a privately controlled institution of higher learning, established by members of the Methodist Episcopal Church, May 26, 1869. In addition to the Schools and Colleges, a Summer Session of the University is maintained, and there is also an Extension Department carried on.

**Bostwick, Arthur Elmore** (1860-1942), American librarian and editor. After being assistant editor of the *Forum* he became librarian of the St. Louis Public Library. He was an associate editor of the *Standard Dictionary* and science editor of the *Literary Digest*. He edited 'Classics of American Librarianship' and contributed to encyclopedias and periodicals.

**Boswell, James** (1740-95), the biographer of Samuel Johnson, and eldest son of Lord Auchinleck, a Scottish judge. Early in 1763, while passing through London, he was introduced to Dr. Johnson, and a warm friendship sprang up between them. From 1767 to 1777 he published various essays and a series of papers, called 'The Hypochondriac,' in the *London Magazine*. In 1785 he published the *Journal of a Tour to the Hebrides*, and in 1786 he was called to the English bar.

In May 1791, Boswell produced his extraordinary successful *Life of Dr. Johnson*. But the author succumbed to hypochondria and alcoholism to which he had given way after his wife's death in 1789. It is generally conceded that the *Life of Johnson* stands alone in the English language for the faithful portraiture of its subject. Charles Rogers edited (1874) for the Philobiblon Society a curious tract relating to Boswell, called *Boswelliana*.

**Bosworth (Market Bosworth)**, market

town, England. Here Richard III. was defeated and slain by Henry Richmond in 1485; p. 23, 202.

**Bosworth, Joseph** (1789-1876), Anglo-Saxon scholar. In 1829-40 he acted as chaplain in Holland, and in this time appeared the *Anglo-Saxon Dictionary* (1838), his principal work. In 1858 he was appointed to the Rawlinson professorship of Anglo-Saxon at Oxford, and in 1867 he gave \$50,000 for a similar endowment at Cambridge.

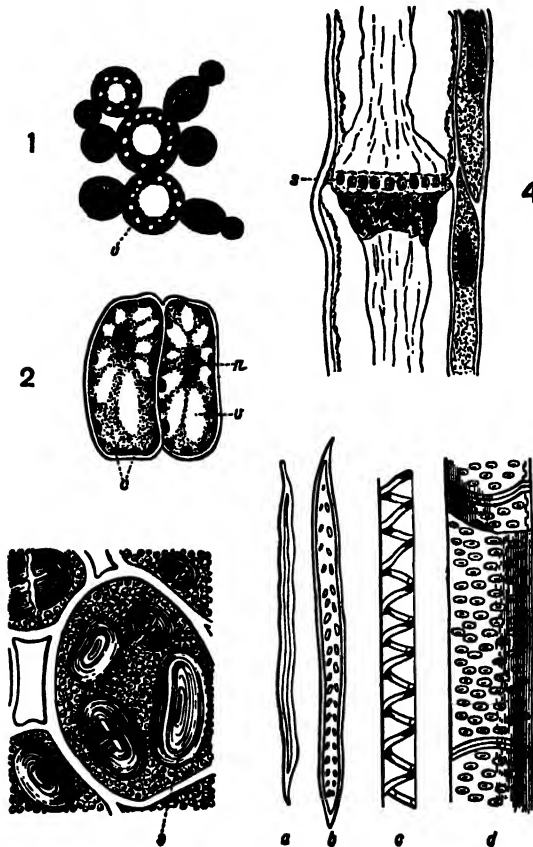
**Botanical Society of America**, a general association of leading American botanists, organized in 1893.

**Botanic Garden**, a garden in which the plants grown, and the methods of their arrangement and cultivation are intended to subserve some definite scientific purpose. Perhaps the first record of a garden of this kind occurs early in the 14th century, as belonging to a member of the Salernitan school of medicine. With the Renaissance and the study of what is now called natural science came botanic gardens in the modern sense. Some of the most important are: Jardin des Plantes, Paris; Kew, in England; Buitenzorg, Java; Bronx Park, in New York City. Near the city of Boston is the Arnold Arboretum, a public park which is especially rich in trees and shrubs. At the present time nearly all great universities have at least a small botanic garden.

**Botany**, that branch of the wider science of biology which deals with plants. It was not until the first half of the 16th century that there was anything like a scientific treatment of botany, which is generally thought to have commenced with Brunfels of Strassburg (1488-1534), who described 340 species. Linnæus (1707-78) is justly reckoned the father of modern botany; but Tournefort (1656-1708), professor of botany at the Jardin des Plantes, Paris, drew up a scheme which held its ground till the days of Linnæus. It had two main divisions—herbs and trees. The characters and arrangement of the reproductive organs (stamens and pistils) were the basis of the Linnæan system (1735). It consisted of twenty-four classes, of which the last contained the mosses, ferns, lichens, seaweeds, and fungi, while the rest comprised the flowering plants. This was avowedly provisional; no classification indicating real relationship was possible till it was attempted on the basis of evolution.

1. Cryptogams. (1.) Thallophytes.—Single or many celled plants, the vegetative portion

not being differentiated into leaves and stem. flowers generally hermaphrodite: grasses, Here are grouped bacteria, diatoms, algæ, herbaceous plants, and shrubs, and all foliage fungi, and stoneworts. (2.) Bryophytes.— The liverworts spring from a thallus, while the mosses show division into stem and leaf; but none have true roots. (3.) Pteridophytes. Morphology.—Here we have to do with external form and internal structure. Internal morphology (often called *histology* or



#### Botany: Histology

Types of plant cells:—1. Cells of yeast, a simple fungus, showing cell spaces or vacuoles (*v*). 2. Two cells from a leaf, showing chlorophyll corpuscles (*c*), nucleus (*n*), and cell spaces (*s*). 3. Starch-containing cells from seed-leaf of pea—(*s*) starch grain. 4. Sieve-tube from vascular-bundle, showing sieve-plate (*s*) or perforated partition, at the sides are nucleated companion cells (after Strasburger). 5. Elements of wood. *a*, wood fibre; *b*, tracheid, with pitted wall; *c*, vessel with spiral thickening; *d*, vessel with pitted wall—the cross bands show the original cell walls.

—These show relationship to the flowering plants in having root, stem, and leaves.

2. Phanerogams, the true flowering plants.

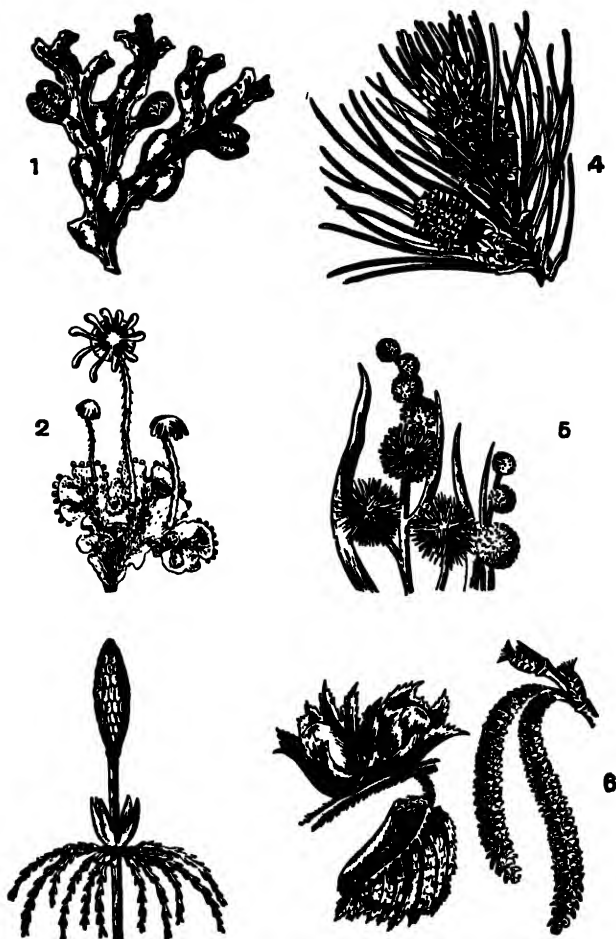
(1.) Gymnosperms.—The flowers always unisexual; cycads and conifers constitute nearly the whole class. (2.) Angiosperms.—The

vegetable anatomy) shows how this structure is built up. In all organisms the ultimate unit is the cell. Hooke was the first to detect plant cells, and figured dead cork cells in his *Micrographia* (new ed. 1667). Their importance, however, was not recognized till

Schleiden's work in 1838 showed that plants were built up of cells and modifications of cells.

*Physiology* is concerned with plants as living organisms—*i.e.* with the functions of the

exceptions) is liquid and gaseous. The former is water combined with various earthy salts, and is absorbed by the roots; the latter consists of carbon dioxide, absorbed from the atmosphere by the leaves, in which it is



*Botany: Classification of Plants.*

1, Thallophytes—An alga or seaweed (*Fucus*). 2, Bryophytes—A liverwort (*Marchantia*). 3, Pteridophytes—Part of the fertile shoot of horsetail (*Equisetum*). 4, Gymnosperms—Branch of fir (*Pinus*) with male and female cones. 5, Monocotyledons—Flowers of bur reed (*Sparganium*). 6, Dicotyledons—Male and female Catkins and fruit of hazel (*Corylus*).

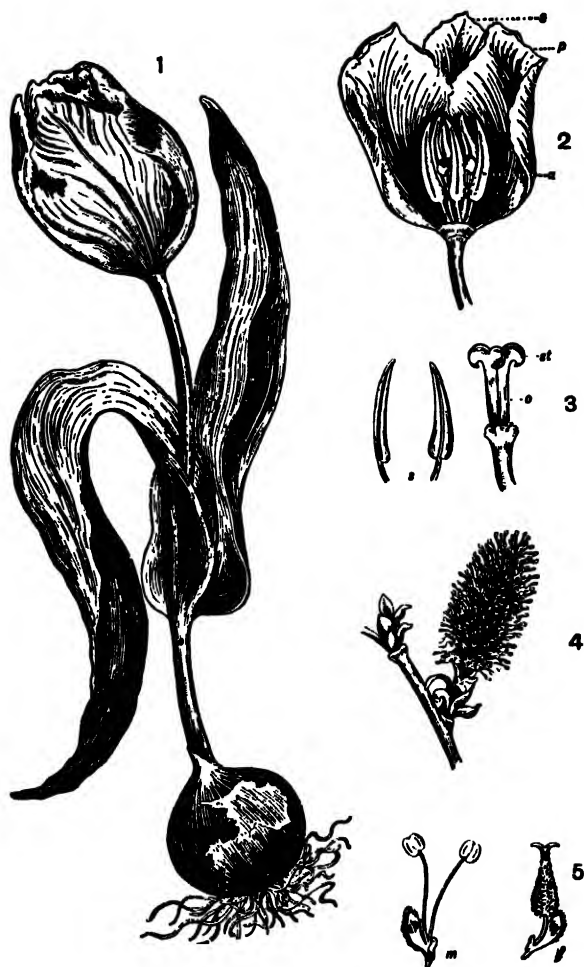
organs of nutrition and reproduction. In the simplest form food may be taken in at any part of the body, while reproduction is effected by means of single-celled bodies called spores. The food of plants (with some few

broken up under the influence of sunlight, the carbon being retained to nourish the plant, while the oxygen is given back to the air. The crude sap (the water impregnated with salts) taken up by the roots passes through

the stem to the leaves, where starch is formed and free oxygen given off. The reproduction of the higher plants is sexual. In the stamen the essential part is the anther, or little bag at the top, containing the pollen grains or male cells, while the ovules in the ovary enclose the female cells in the embryo sac.

When in the process of fertilization the pollen is shed on the stigma, the grains send out tubes which carry the male cells down to the egg cells. By this process, and the consequent changes, the ovule becomes a seed, and the persistent parts of the flower a fruit.

It was not till the beginning of the 19th



*Botany: External Morphology. —*

1. External morphology of tulip, showing roots, modified stem or bulb, leaves, and flower. 2. Section of tulip flower; *s*, one of outer leaves or sepals; *p*, one of inner leaves or petals; *a*, anther of stamen. 3. Stamens and gynoecium of tulip; *o*, ovary; *st*, stigma—the style is here absent—*s*, stamens. 4. Catkin of willow, a dioecious plant. 5. Individual florets of willow: *m*, male flower, with two stamens; *f*, female flower, with ovary crowned with cleft stigma. In these flowers sepals and petals are absent.

century that anything of importance was done in the study of fossil plants. This study has confirmed the theory of evolution; for with plants, as with animals, there is an upward tendency from the lower and older to the higher and more recent rocks. In the Primary or Palæozoic rocks seaweeds occur as low as the Silurian; and in the Upper Silurian, ferns, horse-tails, and lycopods, which attained their maximum in Carboniferous times, marked also by conifers and cycads. Palms and dicotyledons appear in early Tertiary times.

Consult Platt, R. H., *This Green World* (1942); Anderson, Edgar, *Plants, Man and Life* (1952).

**Botany Bay**, a suburb of Sydney, New South Wales. On the s. side of the bay is a monument commemorating the landing of Captain Cook on April 28, 1770. The place is popularly associated with the transportation of criminals, the British government having sent Commodore Phillip to found a penal settlement there in 1787. He, however, selected a more suitable site a little farther north; p. including Botany North. 7,167.

**Bot-fly**, or **Horse Bot-fly** (*Gastrophilus equi*), an insect which lays its eggs on the hair of horses, especially the hair of the legs and breast. The bot of sheep is related but differs in habits.

**Both, Jan** (1610-52), Dutch painter, one of the first of his countrymen to become Italianized, was born in Utrecht. He went to Rome with his brother Andreas (1609-50), who painted figures and animals into his landscapes. Jan's subjects are the Italian lakes; his work is in the style of Claude Lorraine, wrought in warm color, with beautiful sunlight effects. See H. Harvard's *Dutch School of Painting* (trans. by G. Powell, 1885) and Radcliffe's *Schools and Masters of Painting* (1898).

**Bothnia**. See Sweden. For Gulf of, see Baltic Sea.

**Bothriocephalus**, a genus of tapeworms, of which *B. latus*, the broad or Russian tapeworm, occurs frequently in man.

**Bothwell**, tn. and par. N. Lanarkshire, Scotland. About a mile s.e. is Bothwell Brig, in the haughs at which, June 22, 1679, the Covenanters were routed by the Duke of Monmouth. (See Scott's *Old Mortality*.) Joanna Baillie, the poetess, was born here in 1762; p. 60,284.

**Bothwell, James Hepburn**, Fourth Earl of (1736-78), husband of Mary Queen of Scots. In 1560 the queen-dowager entrusted

him with a special mission to France. Recalled by the queen in 1565 to assist her in subduing Moray's rebellion, he, after the murder of Rizzio in March, 1566, gradually acquired a supreme influence in her counsels; and there can be no doubt that his determination to secure her hand was the chief cause of Darnley's murder. At the same time, both he and the queen were the dupes of coolers and cleverer intriguers, and his marriage rendered the ruin of both inevitable. At Carberry Hill the queen, to save Bothwell's life, made arrangements by which he should be permitted to escape. After lurking for some time in the north of Scotland, he made an attempt to establish himself in the Orkneys as a kind of pirate; but on being pursued by Kirkcaldy of Grange, he escaped to Denmark, arriving at Copenhagen on September 30, 1567. At first he met with a favorable reception, but was never at liberty. In June, 1573, he was removed from the castle of Malmö to close imprisonment at Drangholm, in Zealand, where he died (April 14, 1578).

**Bo-Tree**, also called **Pipal** or **Peepul**, the *Ficus religiosa*, or sacred fig-tree of India, held in veneration by the sect of Vishnu, and also by the Buddhists.

**Botta, Carlo Giuseppe Guglielmo** (1766-1837), Italian historian, born in Piedmont. In 1809 Botta published at Paris his *Storia della Guerra dell' Indipendenza d' America*, thought by some to be the best history of the Revolutionary War that has been written outside the United States. More important is the *Storia d' Italia dal 1780 al 1814* (Paris, 1824; Eng. version, Lond., 1826), which narrates events of which the author had largely been an eyewitness. See *Lives* by Dionisotti (1875) and S. Botta (1877).

**Botta, Paul Emile** (1802-70), archaeologist, son of the preceding, born at Turin. In 1843 he began a series of archaeological investigations among the Babylonian ruins, and conveyed to Paris a large number of fragments of monuments, which now form an Assyrian museum. His chief works are *Mémoires de l' Ecriture Cunéiforme Assyrienne* (1848), *Monument de Ninive* (1847-50), and *Lettres sur ses Découvertes à Khorsabad* (1845).

**Botta, Vincenzo** (1818-94), Italian-American educator, was born at Cavaller Maggiore, Piedmont, Italy. He prepared reports on the German educational system for the Sardinian government, and came to the U. S. for the purpose of studying its public-school



system in 1853. Botta published works on Dante and Cavour.

**Bottesini, Giovanni** (1823-89), famous player on the double-bass, was born at Crema in Lombardy, and died at Parma. In 1887 his oratorio, *The Garden of Olivet*, was produced at the Norwich musical festival. He also composed operas, and wrote a work on his instrument.

**Botticelli, Alessandro ('Sandro') di Mariano Filipeppi** (1447-1510), Florentine painter, took his name from the goldsmith to whom he was apprenticed. For painting he was placed under the best master of the day, Fra Lippo Lippi, and later studied with Pollaiuolo and Leonardo. His work is marked by brilliance of color, admirable lineal decoration, and exquisite delicacy in the execution of flowers, foliage, stone-work, jewels, etc. There is charm in his figures—in the melancholy of the face, in the floating, curving draperies. The known details of his life are few. His finest work was done under the patronage of the Medici. In the *Adoration of the Magi* (Florence Academy) all the members of the Medici family are represented as participating in the scene. His paintings adorn the famous galleries of the world. His chief paintings comprise *Venus Rising from the Sea* (Uffizi, Florence); *Spring, or Venus and the Graces* (Florence Academy); the exquisite circular panel of *Madonna and Child* (Uffizi); *Annunciation* (Uffizi); *Venus and Mars* (National Gallery, London); *Calumny* (Uffizi). In 1500 he painted the symbolical *Nativity* (National Gallery, London). In his later years he devoted himself to engraving. Among these engravings are the designs (Berlin) of the *Inferno* for Landino's edition of Dante (1481); Botticelli is usually credited with the design, and Baccio Bandini with the execution. Consult Ady, J. M. C., *Sandro Botticelli* (1903); Spender, Stephen, *Botticelli* (1948).

**Bottini, Enrico** (1837-1903), Italian surgeon, was born at Stradella, prov. Pavia. He became lecturer in obstetrics and surgery at Novara. In 1877 he was appointed professor of surgery at Pavia, a chair occupied by Scarpa and Porta. Here he distinguished himself by remarkable advances in operative surgery.

**Bottle**, a vessel with a narrow mouth for holding liquids. The first bottles were probably made of the skins of animals, principally goats. Not only are skin bottles represented on the monuments of Egypt, but Herodotus describes how those Egyptian bottles were made—by sewing up the skin and making one

of the legs to serve as a neck. Repeated reference is made in Scripture to the skin bottles of the ancient Hebrews. The ancient Egyptians had bottles and vases of various other materials, such as stone, alabaster, porcelain, ivory, gold, silver, bronze, and glass, some of them of beautiful design. Venice held the monopoly of the manufacture of glass bottles during the middle ages. In China, beautiful bottles of various forms and substances, such as jade, agate, and rock-crystal, have long been known.

Bottles made of the dried rind of gourds are used by the Italian peasantry. In the middle ages leather bottles were in common use in Europe. Modern bottles are mostly made of glass, though earthenware or stoneware bottles for special purposes are extensively manufactured. Bottle-making is the simplest branch of glass-working. The operator gathers sufficient molten glass on the end of his blowpipe, partially inflates it by the breath, and drops it into a brass or iron mould, in which it is blown into its permanent form. The blowing is now done, especially in the case of wide-mouthed bottles and jars, by machinery.

**Bottle Gourd**, or **Calabash**, a plant of the genus *Lagenaria* and order Cucurbitaceæ. Its bottle-shaped fruit is used for holding water.

**Bottle-head** or **Bottle-nose**, a small whale (*Hyperoödon rostratus*), the bottle-nose whale, or blackfish, which reaches a length of about 30 ft., and inhabits the N. Atlantic Ocean.

**Bottling Machine**, for filling bottles, the liquid flowing into bottles via siphon tubes or by means of air or gas pressure.

**Bottome, Phyllis (Mrs. A. E. Forbes Dennis)** (1884- ), English novelist, born in Rochester; wrote *Private Worlds* (1934), *London Pride* (1941), *From the Life* (1944).

**Bottomley, Gordon** (1874- ), English poet, best known for poetic dramas collected in two volumes, *King Lear's Wife* (1915), and *Gruach and Britain's Daughter* (1921), *Kate Kennedy* (1945).

**Bottomry**. In maritime law, a conditional obligation in which the ship or its cargo or both are pledged as security for a loan. When the cargo alone is pledged the obligation is known as a *respondentia*.

**Botulism**, poisoning caused by eating spoiled food.

**Boucher, François** (1703-70), French painter and decorator of the Louis xv. period. He was to some extent influenced by

Watteau. Gradually the precision of his early work gave way to the perfunctory pictures of his decay. His decorations for the boudoir of Mme. de Pompadour, his friend and patroness, some of his most charming work, were bought by the Marquis of Hartford. He painted several portraits of his patroness, and also painted pastoral and religious subjects, designed tapestry, and executed scene-paintings, and was appointed (1765) painter to the king. After France, the Wallace Collection, London, possesses the greatest number of his pictures. See Lady Dilke's *French Painters of the Eighteenth Century* (1890).

**Boucher, Crevecoeur de Perthes, Jacques** (1788-1868), French author and archæologist, who advocated extreme views of the antiquity of man. His chief works are *De La Création* (1839-41) and *Antiquités Celtiques et Antédiluviennes* (1846-65). See *Life in French*, by Ledieu (1885).

**Bouches-du-Rhone**, dep. of S. France, on the Mediterranean, e. of the Rhone. It contains large tracts of uninhabitable land. The climate is hot and dry, with occasional strong north winds (*mistral*). The chief product is fruit, as the olive, fig, almond, and mulberry; p. 976,200.

**Boucicault, Dion** (Dionysius Bourcicault) (1822-1890), Irish dramatist and actor; writer of successful dramas and actor of distinction in England and America. His first play, *London Assurance*, won him instant recognition. Boucicault made a signal triumph, with *The Colleen Bawn*, a sensational drama—the first of its kind—following in some degree the plot of Gerald Griffin's *The Collegians*. It was succeeded by *The Octoroon* (1861), *Arrah-na-Pogue* (1865), *Led Astray* (1874), and *The Shaughran*, particularly an American favorite (1875). Boucicault visited America three times, remaining there after 1876, and dying in New York. The plays mentioned form but a small portion of his dramatic works. As an actor Boucicault was not exceeded in light touches of humor and pathos by any performer of his time.

**Boudinot, Elias** (1740-1821), American statesman and philanthropist. One of his books, *A Star in the West* (1816), is an effort to identify the North American Indians with the lost tribes of Israel.

**Bougainville, Louis Antoine de** (1729-1811), French admiral, served in Montcalm's campaign in Canada (1756-9), and again in Germany during the Seven Years' War. After a futile attempt to colonize the Falkland Is.,

he commanded the first French expedition round the world (1766-9), which led to many important geographical discoveries. See his *Voyage autour du Monde* (1771-2; and Parkman's *Montcalm and Wolfe* (1884).

**Bougainvillea**, in botany, a genus of the order Nyctaginaceæ, a native of S. America. *B. glabra* is grown extensively as a creeper in greenhouses.

**Bought and Sold Note**. A memorandum of sale of chattels made and delivered to the buyer and seller respectively by the broker by whom the sale was effected.

**Boughton, George Henry** (1836-1905), one of the most graceful and refined of modern English painters. His work is highly esteemed in the U. S. as well as in Great Britain. Among his popular pictures is the *Return of the Mayflower*. His *Edict of William the Testy* is in the Corcoran Art Gallery at Washington. See Muther's *Hist. of Modern Painting* (1895-6).

**Bougie** (Fr. 'candle'), a solid cylindrical instrument passed by surgeons into the membranous passages of the body—the gullet or urethra. The term is also applied to rods of substances which melt at the body temperature, and are introduced into the body passages as a vehicle for various drugs incorporated with them.

**Bougie** (anc. *Saldæ*; Arab. *Bejaia*), fort. seapt., Algeria. The French have transformed it into a strongly fortified place; p. 14,552.

**Bouguereau, Adolphe William** (1825-1905), French painter. His pictures are mythological, semi-religious, and fanciful in subject, the chief ones being *Vierge consolatrice*, *La jeunesse et l'amour* (1877), *Le triomphe du martyre* (1855).

**Boulanger, George Ernest Jean Marie** (1837-91), French general and agitator, held various high offices and was at one time the idol of Paris because of his democratic spirit. But on April 2, 1889, he caused considerable excitement by suddenly disappearing from Paris, to escape an impending prosecution for conspiracy by the French government. At the elections in September Boulangism suffered a signal defeat, though Boulanger himself was returned for the Montmartre division of Paris. His opponent was awarded the seat. On Sept. 30, 1891, he committed suicide in a cemetery near Brussels.

**Boulder**, city, Colorado; county seat of Boulder County. It is the seat of Colorado State University, and on account of the climate and the mineral springs is a health re-

sort. Not far from the city is the noted Boulder Cañon. There are valuable mines and oil wells in the vicinity; p. 19,999.

**Boulder Clay**, or Till, a tough, unstratified clay, full of boulders, formed by glacial action. Great deposits occur in Northern Europe and America. See GLACIAL PERIOD.

**Boulder Dam**, a great engineering project—one of the biggest of its kind in the world—is located in Black Canyon, Colorado River on the Arizona-Nevada boundary

tite, often arising from an irritated stomach, or in the course of certain nervous disorders.

**Bouille**, the name of a famous French family of cabinet makers, whose most distinguished member was ANDRE CHARLES (1642-1732), who enjoyed the patronage of Louis XIV. His name is given to the marquetry which he brought to a high state of perfection.

**Boulogne-sur-Mer**, important seaport, France connected with Folkestone by a cross-



Photo, Desert Sea News Bureau

#### HOOVER (Boulder) DAM

*Scene at Las Vegas, Nev. Hoover (formerly Boulder) Dam is 727 feet high, and 45 feet wide at crest providing a four-lane highway.*

about 25 miles southeast of Las Vegas, Nevada. Work on the dam was completed March 1, 1936. The reservoir made by the dam, when filled, is 115 miles long and covers about 145,280 acres. A feature of the project is the All-American Canal, which carries water from the Colorado River to the Imperial Valley (75 miles away) forming a part of the irrigation system of that section. This dam is capable of developing 1,000,000 horsepower in electrical current. Named Hoover Dam 1947.

**Boulevard**, (Fr.; Ger. *bollwerk*, and Eng. 'bulwark'), a word originally denoting the outer fortifications or ramparts of a town. It now designates broad thoroughfares generally well paved and lined with trees.

**Boulimia**, or Bulimia, an excess of appe-

Channel service. The harbor ranks high in France for herring and cod fishing; p. 34,885.

**Boulton**, Matthew (1728-1809), English engineer and inventor, became the partner of James Watt, inventor of the steam-engine, to whom his financial assistance and practical ingenuity were invaluable.

**Boundary**, the legal extent of a parcel of land as laid out and defined in the description thereof or as marked by known and ascertained monuments. In general, monuments govern courses and distances; *i.e.* the location of a tree or other object mentioned in the deed determines the boundary at that point whether it coincides with the survey described in the deed or not. When a boundary is described as running from one point

to another, it is presumed to be a straight line between them. When property is bounded by a road or a river, the middle line of the road or river is presumed to be the boundary. A hedge or a tree on the boundary line is the joint property of the adjoining owners. Trees which overhang a boundary line belong to the owner of the land on which the trunk stands, but the limbs that overhang may be lopped by the adjoining owner back to the line.

**Bounty**, a name given to a grant from the public treasury in aid of some industry which is regarded as of peculiar public importance. Bounties were also commonly granted by European nations to their colonies, to encourage the production of raw materials of which the mother country stood in need. Thus England granted bounties on shipping supplies, indigo, and several other products of the American colonies upon exportation to England. In France, Germany, Austria, and Russia the sugar industry was largely built up by export bounties, direct or concealed. Since the Brussels Sugar Convention in 1903 no bounties, direct or concealed, have been paid by the important exporting nations. (See BRUSSELS SUGAR CONVENTION. For bounties in aid of shipping, see SHIPPING SUBSIDIES.)

In the United States bounties in aid of industry have found only limited application, owing to the constitutional provision that taxes shall be levied only for public purposes. Grants by States and cities in aid of private enterprises have frequently been made, but in every case which has come directly before the courts they have been declared unconstitutional, on the ground mentioned. The name is also applied to a premium, in addition to the customary remuneration, granted to persons upon the performance of important public services, as upon enlistment in the army or navy in time of war. A bounty is sometimes paid by a state or government as reward for riddance of obnoxious animals.

**Bounty, Mutiny of the.** The Bounty, an English ship, sailed to the South Seas in 1787. The crew mutinied and turned Commander Bligh and 18 men adrift in a light boat which finally reached Tahiti. See Byron's poem, "*The Island*" and Barrow's *Mutiny of the Bounty*, also Nordhoff and Hall's *Mutiny on the Bounty and Men Against the Sea*.

**Bourbon, Charles Duc du Bourbon** (1490-1527), French general known as 'Constable de Bourbon'. His royal blood, great

military talents, and his personal bravery, especially at Agnadello and Marignano in 1515, induced Francis I. of France to make him constable of the kingdom, the highest military officer in France, when only in his twenty-sixth year. He attacked Rome with the object of plunder on May 6, 1527, and was killed by a random shot, which Benvenuto Cellini asserts was fired by himself; but Cellini was given to boasting.

**Bourbon Family**, the name of a dynasty which reigned over France from 1589 to 1792, and from 1815 to 1848. The name was derived from the castle of Bourbon, in the old province of Bourbonnais. The founder of the family was Robert (d. 1317), Count de Clermont, son of King Louis IX. His son Louis (1279-1341) was the first Duke of Bourbon, and fought against the English for Charles del Bel. The last and greatest of the eldest branch of the Bourbons was Charles, 'the Constable' (q.v.). Among the collateral branches of the Bourbon family were those of Vendôme, Condé, Montpensier, Orleans, Conti, and Soissons. The younger branch of the Bourbon is the house of Orleans, whose descent starts from Philip of Orleans, brother of Louis XIV. His son Philip was great-grandfather of Louis Philippe, known to the revolutionists as 'Citoyen Egalité.' Egalité's son Louis Philippe became king of the French in 1830, and was dethroned in 1848. See ORLEANS, DUKE OF.

The reign of the family in Spain was cut short by the dethronement of Queen Isabella in 1868; but in 1875 the dynasty was restored in the accession of Alfonso XII., whose son, Alfonso XIII., was overthrown in 1931. See Bingham, *Marriages of the Bourbons* (1889).

**Bourdoulous, Louis** (1632-1704), French pulpit orator, member of the Society of Jesus (1648). His simple, earnest, and fearless character gave him a great influence over all classes. As a preacher he excelled in the orderly treatment of his theme, in logic, and in acute psychological analysis. Voltaire called him, 'the first model of good preachers in Europe.'

**Bourdon**, in music, a drone bass produced by a hurdy-gurdy or a bagpipe; also an organ stop of the diapason group.

**Bourgeoisie** (literally, the class of 'burgesses' or citizens of towns) is a French expression, generally used contemptuously by the aristocratic, labor, proletariat, socialist, and 'intellectual' classes for what they conceive to be a mean, philistine, and selfish breed of capitalists, shopkeepers, and pro-

essional men, whose only ideals are a certain sordid comfort, petty ostentation, and a grotesque respectability.

**Bourges**, tn., France. Owing to its central position it has often been chosen as a meeting-place of councils, seventeen in all, of which the most important was held in 1438; p. 51,040.

**Bourget, Lac du**, the largest lake in France, 11 m. long by 2 m. broad.

**Bourget, Paul Charles Joseph** (1852-1935), member of the French Academy (1894), and one of the most successful of modern French novelists and critics. He published a great number of novels, and with these alternated studies in criticism, written in the urbane, but not very vigorous style which marks most of the French writers who have formed their prose on that of Renan. M. Bourget published some volumes of travel, of which his *Outre-Mer (Voyages en Amérique)*, in 1895, is the best known. Probably his best novel is *Le Disciple* (1889), which contains the elements of fine tragedy. A collected edition of his works began to appear in 1900.

**Bourignon, Antoinette** (1616-80), a French 'visionary,' and founder of a sect called by her name. The leading idea of her system was that religion consists in elevated emotions, not in knowledge and practice. The Bourignonists spread from Holland to Germany, France, Switzerland and even to Scotland (early 18th century), and held a position not unlike that of the Swedenborgians in later times.

**Bourne, Randolph Silliman** (1886-1918) American author, compiled, with Van Wyck Brooks, the *History of a Literary Radical*.

**Bourrienne, Louis Antoine Fauvelet de** (1769-1834), French diplomatist, became confidential secretary to Napoleon. His *Mémoires* appeared in 1829-31 (new ed. 1899-1900), and caused a sensation for their Napoleonic details, but they are unreliable.

**Bourse**, the European name for a stock exchange or money market. See **Stock Exchange**.

**Bouts-rimés** (Fr. 'rhymed ends'), a poetical amusement, very popular in French literary circles in the 17th and 18th centuries, in which the rhymes of a poetical composition are prescribed in their due order, and the contestants are required to compose verses to suit them. Alex. Dumas published a collection of *bouts-rimés* in 1865. See *Addison's Spectator*, No. 60.

**Bovidae** (forms 'like oxen'), a family of mammals which includes all the hollow-horned ruminants. The members of the family are commonly known as antelopes, sheep, goats, and oxen, but the different types are not very sharply separated from one another. See **CATTLE**.

**Bowditch, Henry Ingersoll** (1808-92), American physician, son of Nathaniel Bowditch, became an authority on pulmonary diseases, and published a series of papers on this subject.

**Bowditch, Nathaniel** (1773-1838), American astronomer and mathematician. Refusing the offer of a professorship at Harvard, he became actuary (1823) to an insurance company. He published a *New American Practical Navigator* (1802).

**Bowdler, Thomas** (1754-1825), editor of the expurgated Shakespeare, practised as a physician. Bowdler's reputation depends on his '*Family Shakespeare in ten volumes; in which nothing is added to the original text; but those words and expressions are omitted which cannot with propriety be read aloud in a family*,' (1818)—a work whose method has given us the term 'to bowdlerize.'

**Bowdoin, James** (1727-99), was born in Boston, Mass., and was a friend of Benjamin Franklin, to whom he communicated some of his own discoveries in physics. He was governor of Mass., and in that capacity put down Shay's rebellion. Gov. Bowdoin was a founder and the first president of the American Academy of Arts and Sciences, was prominent in other public ways, and Bowdoin College was named in his honor.

**Bowdoin, James, 2d** (1752-1811), American philanthropist, son of the foregoing, presented Bowdoin College with 6,000 acres of land, and bequeathed to it his extensive collections of books and philosophical appliances made in Europe.

**Bowdoin College**, an institution of higher learning for men in Brunswick, Me., was incorporated by the General Court of Massachusetts in 1794, and named in honor of James Bowdoin, a former governor. The earliest patron of the college was James Bowdoin. It was opened in 1802.

**Bowel**. See **Intestines**.

**Bowen, Francis** (1811-90), American philosophical writer, was editor of the *North American Review* (1843-54); and is the author of *A Layman's Study of the English Bible* (1886), and other books.

**Bowen, Henry Chandler** (1813-96), American publisher. In 1848 he and three asso-

ciates established *The Independent* as an anti-slavery Congregationalist paper; in 1861, the paper was made undenominational.

**Bowenite**, a variety of serpentine found in Smithfield, R. I. It is light green in color, resembling jade, and is noteworthy for its fine texture and hardness.

**Bower-bird**, a name applied to several different birds inhabiting the Australian region and belonging to the family Ptilonorhynchidae. They are all small birds, from 8 to 14 in. long, with a stout bill and, in some species, brilliant plumage. One species builds a hut of elaborate structure, with a central cone of moss, and a surrounding gallery built of orchid stems, open in front to the lawn or 'garden,' which is some nine ft. in diameter, and consists of a bed of bright green moss, decked with brilliant flowers and berries. It appears probable that it is the males who construct the bowers, apparently as places in which they may display themselves before their mates.

**Bowers, Claude Gernade** (1878- ), American historian and diplomat, born in Hamilton Co., Ind., and privately educated. Was U. S. ambassador to Spain (1933-39) and to Chile (1939-53).

**Bowfin, or Mud-Fish** (*Amia calva*), a ganoid fish found in still water in the Mississippi Valley and the Great Lakes region and known locally as 'grindle,' 'lawyer,' or 'dogfish.'

**Bowie-knife**, the heavy sheath knife of the early Southwestern States.

**Bow-legs**, or *Genu-varum*, a bending of the femur or tibia or both, with convexity outwards. It may occur in one leg only, following an accident or operation; but it is usually found in both legs, and the trouble starts when the child begins to walk. The usual cause is rickets. Bow-legs are also induced by certain occupations, as that of postilion or jockey, followed before the bones have attained full growth and hardness.

**Bowles, Caroline**. See *Southey*.

**Bowles, Chester** (1901- ), American public official, was born in Springfield, Mass. and educated at Yale. Was director, U. S. Office of Price Administration (1943-46) and of Economics Stabilization Board (1946) Governor of Connecticut (1949-51); U. S. Ambassador to India (1951-53).

**Bowles, Samuel** (1826-78), American journalist, manager of the *Springfield Republican*, which he developed from his father's weekly to an important daily newspaper. He

published *Across the Continent* (1865) and *The Switzerland of America* (1869).

**Bowling**, a game developed from that of lawn bowls, first played in London in about the 12th century. The first record of a match game in America was in New York City in 1840. It is played in alleys of polished wood, a pit at the end receiving the pins that are knocked down and the balls that knock them. There is a gutter on each side, and 60 ft. from the head pin to the foul line, which the bowler may not pass before dropping the ball. Back of the foul line there must be a clear run of 15 ft. The pins must be set in pyramidal form, four at the pit end of the alley 3 in. from the pit edge measuring from the centre of each pit spot, and the head pin must be in the middle of the alley. The ball must not exceed 27 in. in circumference or 16½ pounds in weight, although it may be as much smaller as the player desires. The game may be played by any number, each player in turn rolling 10 frames, or innings. Each player rolls two balls except when he makes a strike or when a 10th strike or spare is made in the 10th frame. A strike is when the player bowls down all 10 pins with his first ball. Thirty is the highest number which can be made in any frame. Many variations of the ten-pin game are in vogue, as 'head pin,' 'duck pin,' 'candle pin,' 'cocked hat,' etc. Consult Day, Ned, *How to Bowl* (1948).

**Bowling Green**, city, Kentucky, is the seat of Ogden College (non-sectarian), Bowling Green Business University, Western Kentucky Normal School, and St. Columba's Academy; p. 18,347.

**Bowling Green**, New York City, is a small park at the lower end of Manhattan Island, near the foot of Broadway.

**Bowls**, called also **Bowling on the Green** and **Lawn Bowls**, is one of the oldest games in existence, and is said to date back to the days of ancient Greece and Egypt. In the 15th and 16th centuries, bowling alleys were very numerous in England. From those times to the present the game has undergone many changes, and is played in many countries, although it is at its best in Scotland. It was played in New York before the Revolution, and was revived some 25 years ago.

**Bowman, Edward Morris** (1848-1913), American organist and teacher. He was one of the founders, and for many years president, of the American College of Musicians. He was author of *Bowman's Weitzmann's Manual of Musical Theory* (1876) and *Mas-*

*ter Lessons in Piano Playing* (1911).

**Bowman, Isaiah** (1878-1950), American geographer; pres. International Geographical Un. (1931-34); Pres. Johns Hopkins (1935-50).

**Bowring, Sir John** (1792-1872), British linguist and public official. He held various foreign posts and it is said that he acquired a competent knowledge of one hundred languages. Up to 1824 he engaged in commercial pursuits, but found leisure to issue several works. In 1824 he became editor of the *Westminster Review*, and during the next few years published various anthologies of foreign poetry. He published: *Ancient Poetry and Romances of Spain* (1824); *Poetry of the Magyars* (1830); *The Decimal System* (1854); *Servian Popular Poetry* (1827). Consult his *Autobiographical Recollections*.

**Bowsprit**, is a boom or spar projecting over the stemhead of bows of a sailing ship, and also of a steamship when the stem of the latter is of the curved or cut-water description.

**Bow Street Runners.** Bow Street, London, is the site of one of the nine original police courts of the city. The Bow Street Runners, commonly known as 'Robin Redbreasts,' from their scarlet waistcoats, were the only detective force in England prior to 1844.

**Bowstring**, is a name specifically used for an old Turkish mode of execution, the offender being strangled by means of the string of a bow.

**Bowstring Hemp, or Moorva**, a fibre yielded by several members of the genus *Sansiveria* of the Hamdioraceæ, and of the natural order Liliacæ. The fibre obtained from the leaves is used generally for cordage, being especially valuable for its strength and suitability for ropes in deep-sea dredging, as it does not rot in water as soon as hemp.

**Box** (*Buxus*), a genus usually reckoned to belong to the Euphorbiacæ; evergreen shrubs or small trees, with greenish inconspicuous flowers. The common box tree (*Buxus sempervirens*) is remarkable for its compact habit of growth and densely crowded branches and leaves, presenting a very solid mass of foliage; hence it is best known as a garden edging. The value of the wood of the box tree has long been recognized. It is very heavy, of a beautiful pale yellow color and is much valued for the purposes of the turner and the wood carver; it is preferred to every other kind of wood for the manufacture of flutes, flageolets, and other wind instruments, and is unrivalled for wood engraving.

**Box Elder, Ash-Leaved Maple, or Su-**

**gar Maple**, a tree of the maple tribe. See MAPLE.

**Boxers, The**, name given by Europeans to a Chinese society which early in 1900 organized a widespread anti-missionary uprising in Shan-tung and other provinces of Northern China, and murdered many European missionaries and native Christians. The movement was at the same time strongly anti-foreign, and had been to a great extent fostered by the excessive demands of the Western Powers for concessions and the opening up of the country. The Manchu element at court, headed by the dowager empress, encouraged the movement—a course which culminated in the siege of upward of two/hundred foreign refugees within the walls of the British legation at Peking. A relief expedition of about 18,000 troops, made up of American, British, French, German, Russian, and Japanese forces, relieved the garrison on Aug. 14, 1900. The court fled from the capital, and the allies remained in possession until peace was signed on Sept. 7, 1901, one of the conditions of which was that China should pay \$320,000,000 as indemnity to the foreign powers. The share allotted to the United States was \$24,500,000. By 1908 China had paid about \$9,000,000, and Congress then remitted half of the total indemnity. For this act China sent official thanks and announced that the sum remitted would be used to send Chinese students to the United States.

**Boxing, or Pugilism**, the art of fighting with the fists, generally with padded gloves. The development of modern boxing dates from the early 18th century. The sport was first brought into prominence by James Figg, in London, in 1719, and became popular in 1734-50, when Jack Broughton flourished. To this noted boxer we are indebted for the invention of the boxing glove, or muffer as it was then called, as well as for the first code of rules, from which those at present in force have been developed. Much of the scientific development of boxing has originated in the United States, and there most of its professional champions have lived. Though the prize fight to a finish, or 'knock out,' is now forbidden in nearly all the States, limited-round bouts between professionals, under varying legal restrictions, are of frequent occurrence in the larger cities. Amateur boxers form a numerous host, and many of the foremost athletic clubs promote the sport by holding boxing tournaments. Annual championships are conducted under the auspices of the Amateur Athletic Union.

The six main fighting classes or weights are: the Bantam (116 lbs.), Feather (122), Light (133), Welter (145), Middle (158), and Heavy (over 158 lbs.).

In boxing competitions the result is usually decided by the *Marquis of Queensberry Rules*, which are principally as follows: A boxing match shall be a fair stand-up contest in a 24-ft. ring, or as near that size as practicable. No wrestling or hugging shall be allowed. The rounds shall be of three minutes' duration, with one minute's time after each round. If either man fall, he must get up unassisted, ten seconds to be allowed him to do so. When he is on his legs again the round is to be resumed, and continued until the three minutes have expired. If he fails to come to scratch in the time allowed, the referee may award the match to the other. A man on one knee is considered down, and if struck is entitled to the stakes. Consult Durant, John, and Rice, Edward, *Come Out Fighting* (1946); Fleischer, N. S., *The Heavyweight Championship* (1949).

BOXING: Heavy-weight Contests of Recent Years

Year	Winner	Losers
1892	James J. Corbett	John L. Sullivan
1897	R. Fitzsimmons	James J. Corbett
1899	James J. Jeffries	R. Fitzsimmons
1900	James J. Jeffries	James J. Corbett
1903	James J. Jeffries	James J. Corbett
1910	Jack Johnson	James J. Jeffries
1915	Jess Willard	Jack Johnson
1919	Jack Dempsey	Jess Willard
1921	Jack Dempsey	Georges Carpentier
1923	Jack Dempsey	Angel Firpo
1926	Gene Tunney	Jack Dempsey
1927	Gene Tunney	Jack Dempsey
1928	Gene Tunney	Thomas Heeney
1930	Max Schmeling	Jack Sharkey
1932	Jack Sharkey	Max Schmeling
1933	Primo Carnera	Jack Sharkey
1934	Max Baer	Primo Carnera
1935	James Braddock	Max Baer
1937	Joe Louis	James Braddock
1938	Joe Louis	Max Schmeling
1941	Joe Louis	Billy Conn
1942	Joe Louis	Abe Simon
1946	Joe Louis	Billy Conn
1946	Joe Louis	Tami Maurello
1947	Joe Louis	Joe Walcott
1948	Joe Louis	Joe Walcott
1949	Ezzard Charles	Joe Walcott
	(following Joe Louis' retirement; N.B.A. recognition only)	
1950	Ezzard Charles (in Louis' attempted comeback; universal recognition)	Joe Louis
1951	Joe Walcott	Ezzard Charles
1952	"Rocky" Marciano	Joe Walcott
1953	"Rocky" Marciano	Roland LaStarza
1954	"Rocky" Marciano	Ezzard Charles
1954	"Rocky" Marciano	Ezzard Charles

**Boxing Day**, an English bank holiday falling on the day after Christmas.

**Boxing the Compass**, a nautical phrase

meaning to enumerate in their proper order, the points of the compass, an early lesson in navigation.

**Box-thorn** (*Lycium*), a genus of Solanaceae. *L. vulgare*, the Matrimony Vine, cultivated in the United States, has small, narrow grayish green leaves, and purplish or violet-colored flowers followed by scarlet or black berries.

**Boyacá**, or **Bojaca**, department, Colombia, having the republic of Venezuela on its eastern frontier, and traversed by the Eastern Cordilleras of the Andes; area, 16,460 sq.m. Cattle raising is the chief industry; p. 685,866. The town of this name was the scene of the victory of General Bolivar over the Spanish (Aug. 7, 1819), by which Colombia secured her independence; p. 7,000.

**Boyar**, the highest rank, military and civil, next to *Knyaz* (prince), in the old Russian aristocracy.

**Boy Bishop**. On St. Nicholas' Day (Dec. 6) in the mediæval church, it was the custom to allow choir boys of churches to choose one of their number who acted as boy bishop until Holy Innocents' Day (Dec. 28). The boy bishop, attired in suitable vestments and attended by a number of assistants, travelled about, blessing the people, and performing many of the episcopal ceremonies. The practice was abolished in England in the reign of Elizabeth.

**Boycott**, a term originating in 1880 during the struggle between the Irish Land League and the English landlords. The harsh exactions of Captain Boycott led the tenantry to organize a movement to hold no dealings with him or his family. The word 'boycott,' coined at that time to describe the action of the tenants, later came to indicate the concerted refusal of organized workers to purchase commodities produced in a shop whose management refused to apply trade-union wage rates and working conditions. This concerted action usually included, also, efforts to persuade others to divert their patronage from the 'unfair' concern—the so-called 'secondary boycott.' In three cases carried to the U. S. Supreme Court it has been decided that the boycott is a combination in restraint of trade, and therefore illegal.

The most celebrated was the Danbury Hatters' Case, 1902, where the issue was the securing of a union shop and the boycott, which extended to all firms selling the goods there manufactured was declared by the Supreme Court to be a violation of the Sherman



Anti-Trust Act. In the Buck's Stove Case, 1906-07, the strike involved the firm's refusal to deal with representatives of organized labor. In the Duplex Printing Company Case the Supreme Court reaffirmed in 1921 the type of decision made in the Danbury case in 1902.

In addition to its use in labor disputes, the term 'boycott' is frequently employed in certain forms of mass action, as consumers' boycotts; in cases of social ostracism; and in political and nationalistic action, as in the Chinese boycott of Japanese goods, 1920, and the Indian boycott of English goods under the leadership of Mahatma Gandhi.

In recent times the boycott was applied against Germany in retaliation for alleged mistreatment of Jews under the National Socialist regime.

**Boyd, Ernest Augustus** (1887-1946), American journalist, critic and translator, born in Ireland. His published works include *Contemporary Drama of Ireland* (1917); *Ireland's Literary Renaissance* (1922); *Portraits—Real and Imaginary* (1924); *Studies in Ten Literatures* (1925); *Literary Blasphemies* (1927); besides many translations of Anatole France, Guy de Maupassant and others.

**Boyd, James** (1888-1944), American author. He holds high rank among the younger generation of American writers. His works include *Drums* (1925), *Marching On* (1927) and *Long Hunt* (1930); *Roll River* (1935).

**Boyden, Seth** (1788-1870), American inventor. He invented a machine for splitting leather; introduced the manufacture of patent leather into America (1818); discovered the process of making malleable cast iron (1826); and made important changes in construction of locomotives.

**Boyer, Jean Pierre** (1776-1850), mulatto general and president of the republic of Haiti, was born in Port-au-Prince. He joined Pétion and Christophe in overthrowing Desalines; in 1818 was elected president, and soon ruled over the whole island. In 1825 he obtained recognition of the republic from France. His cruel, despotic administration eventually stirred up an insurrection, and in 1843 he was forced to flee to Jamaica.

**Boyesen, Hjalmar Hjorth** (1848-95), American author and educator. His published works include: *Gunnar, a Norse Romance* (1874); *Falconberg* (1878); *Goethe and Schiller* (1878); *Ilka on the Hilltop* (1881; dramatized in 1884); *Idyls of Norway* (poems, 1882); *A Daughter of the Philis-*

*tines* (1883); *Social Stragglers* (1884); *Story of Norway* (1886); *The Golden Calf* (1892); *Essays on German Literature* (1892).

**Boyle, Robert** (1627-91), English physicist and chemist, was born in Lismore Castle, Ireland. Devoting himself to chemistry in 1660, he published, *New Experiments, Physico-Mechanical*—in an appendix to the second edition of which (1662) he enunciated and roughly proved the statement, now known as *Boyle's Law*, that 'the volume of a given mass of gas is inversely proportional to its pressure.'

**Boys' Brigade, The**, a movement set on foot in 1883 by Sir W. A. Smith of Glasgow, Scotland, its object being 'the advancement of Christ's kingdom among boys, and the promotion of habits of obedience, reverence, discipline, self-respect, and all that tends toward a true Christian manliness.' The organization is established in the British colonies and the United States. Its total strength is about 70,000 officers and boys.

**Boy Scouts**, an organization of boys and youth between the ages of twelve and eighteen years and upward, which aims to develop character, to aid in furnishing equipment for a career, and to train in service for others, physical health, and efficient citizenship, by utilizing the natural activities and interests of the adolescent period.

The development of the boy scout movement in England is due to Lieut.-Gen. Sir Robert S. S. Baden-Powell. The first boy scouts organization was formed in 1908.

In the United States Daniel Carter Beard, Ernest Thompson Seton, and others had much to do with the early success of the movement. *The Boy Scouts of America*, incorporated Feb. 8, 1910, is non-military and interdenominational in character, the movement being supported by Catholics, Protestants, and Jews alike.

The Chief Scout Executive's office and the National Headquarters are at New Brunswick, New Jersey, where are issued the official publications, including the Boy Scout's magazine, *Boy's Life*.

The scout oath reads as follows: 'On my honor, I promise that I will do my best—(1) to do my duty to God and my country, and to obey the scout law; (2) to help other people at all times; (3) to keep myself physically strong, mentally awake, and morally straight.'

**Boyton, Paul** (1848-1924), natatory expert, became a submarine diver, and invented an inflated rubber suit for swimming long

distances. One of his journeys was from the mouth of Cedar Creek, Mont., to St. Louis, Mo., a distance of 3,580 m. His plunge from a vessel 40 m. off the Irish coast, in a furious storm, and his crossing of the English Channel in twenty-four hours (1875) were noteworthy. He wrote *Roughing It in Rubber* (1886).

**Bozen**, town and summer resort in Tyrol, Italy; in the middle ages an important emporium in the trade between Venice and Central Europe, and still the chief commercial centre of Tyrol; p. 24, 126.

**Bozzaris, Marcos** (1788-1823), celebrated Greek patriot. From early youth he was in the midst of the struggle for Grecian independence from Turkish rule.

**Brabançonne, La**, the national song of Belgium, composed and sung during the revolution in 1830.

**Brabant. South Brabant**, prov. of Belgium, in the middle of the kingdom, and the most densely inhabited province of Belgium (998 inhabitants to the sq.m.). Both agriculture and manufacturing industries flourish. **NORTH BRABANT**, prov. in s. of Holland, to the e. of Zeeland; very level, marshy, and generally un fertile. Area, 1,822,854.

**Bracciano, tn.**, prov. Rome, Italy. It has a vast baronial castle, built by one of the Orsini in 1480, and since 1696 The Lake of Bracciano, known to the ancients as *Lacus Sabatinus*, fills an extinct crater, and lies 540 ft. above sea-level, but has a depth of over 800 ft., or 260 ft. below sea-level. It has been famous for its fish since Roman times.

**Bracciolini, Francesco** (1566-1645), Italian poet, produced an imitation of Tasso, much admired in its time, in the *Crace Riacquistata* (1605-11), which narrates in 35 cantos the war waged by the Emperor Heraclius against the king of Persia for the recovery of the cross. In the burlesque poem, *Lo Scherzo degli Dei* (1618-26), the ancient gods are parodied after the manner of Tassoni. See Barbi, *Notizia della Vita e delle Opere de F. Bracciolini* (1897).

**Brace, Charles Loring** (1826-90), American philanthropist and author, devoted himself to ameliorating the condition of the lowest classes by founding the New York Children's Aid Society and other organizations. His most important publications are *Hungary in 1851* (1858); *Home Life in Germany* (1853); *Norse Folk* (1857); *Races of the Old World* (1863); *The New West, or California in 1867-8* (1868); *The Dangerous Classes of New York* (1872); *Gesta Christi* (1883);

*The Unknown God* (1889). See *Life* by his daughter (1894).

**Bracegirdle, Anne** (?1663-1748), English actress. She was at home in tragedy as well as in comedy, and her professional career was a long series of triumphs until she retired from the stage in 1707, eclipsed by Mrs. Oldfield. See Baker's *English Actors* (1879).

**Bracelet**. An ornamental band worn on the arm or wrist. In the stricter sense, bracelets or armlets are of various types: Prehistoric bracelets of gold and bronze, the gold generally plain, the bronze most frequently richly decorated and sometimes set with enamels. Some of the latter were also arranged as a coil down the arm. The Norse or Viking type consisted of large bracelets of finely-twisted silver terminating in knobs or in hooks. Bracelets of chain-work were worn by Hebrew women. Enamelled bracelets of various metals prevailed in Egypt. Bracelets were worn by both men and women among the ancient Germanic tribes and among the Romans, and were bestowed upon distinguished warriors and others as a mark of honor. But since about the end of the 12th century the wearing of bracelets has been chiefly confined to women.

**Brachial Artery**, the artery carrying the blood to the arm. It is a prolongation of the axillary artery. It begins at about the lower border of the armpit, and ends by dividing into the radial and ulnar arteries just below the bend of the elbow, lying, in its upper part, in a position corresponding to that of the inner seam of a sleeve, and gradually sweeping outward to the front of the elbow joint.

**Brachiopoda**, 'arm-footed', an interesting group of animals which, owing to the presence of two calcareous shells, have sometimes been included in the group Mollusca, but



*Brachiopoda.*

1, With one shell removed. 2, Entire.

which are now placed in proximity to the Polyzoa or Bryozoa, which they resemble in many points. They vary from less than half an inch to 1 or rarely 2 inches in length and

externally resemble the ordinary bivalve. The shells, however, lie dorsally and ventrally instead of right and left. The food seems largely to consist of diatoms, but the Lingulidae are also known to sweep in small crustaceans and abundance of mud. They are all marine, and attach themselves to rocks, corals and molluscs. There are about 100 species existing at the present time.

**Brachycephalic.** See **Skull**.

**Brachyura**, 'short tails,' a name given to those decapod crustaceans in which the tail is short and bent beneath the body—the common edible crab.

**Brackenridge, Hugh Henry** (1748-1816), American lawyer and author. He was a justice of the Penna. Supreme Court from 1799 until his death. He wrote *Modern Chivalry; or the Adventures of Captain Farrago* (1796-1806), and *The Battle of Bunker Hill*, a drama (1776). He composed, with Philip Freneau, a poetical dialogue, *The Rising Glory of America* (1772).

**Bracton, or Bratton, Henricus de** (d. c. 1268), English ecclesiastic and judge. His comprehensive treatise, *De Legibus et Consuetudinibus Angliæ*, one of the greatest of European mediæval law books, was written just as the victory of the royal courts over their rivals, the feudal and the local courts, was being completed. Bracton did much to bring about the victory, and to establish one 'common law' for the whole of England.

**Braddock, borough**, Pennsylvania. It has the first Carnegie Library established in America and a hospital, and nearby is Kenneywood Park. The principal manufactures are iron and steel. The locality was the scene of General Braddock's defeat, July 1775; p. 16,488.

**Braddock, Edward** (1695-1755), British soldier in America, was born in Perthshire, Scotland. He was placed in command of the British regular and colonial forces in America, landing at Hampton, Va., in February, 1755. On the banks of the Monongahela River, he was ambushed by Indians and French, and after displaying great bravery was mortally wounded and his army routed with great slaughter. Col. George Washington, one of the few officers who escaped unharmed, conducting the retreat.

**Braddock, James J.** (1906- ), boxer won world's heavyweight championship by defeating Max Bear, 1935. Lost to Joe Louis, 1937.

**Braddon, Mary E.** (1837-1915), Eng. novelist, b. London. *Lady Audley's Secret*

(1862), made her name as a novelist, followed by the equally popular *Aurora Floyd* (1863), *Eleonor's Victory* (1863), *Henry Dunbar* (1864), and numerous other works, bringing her total production to well over sixty novels. Miss Braddon became the wife of Mr. John Maxwell, publisher, in 1874. Their son, William B. Maxwell, is a novelist of note.

**Braden, Spruille** (1894- ), Am. diplomat, born at Elkhorn, Mont., and ed. at Yale. He was U. S. ambassador to Colombia (1939-42), to Cuba (1942-45), to Argentina (1945); U. S. Asst. Secy. of State (1945-47); pres., Am. Arbitration Assn. (1949- ).

**Bradford**, city, England. Notable buildings are the Town Hall in mediæval Gothic style; the Exchange; St. George's Hall; the Library; the Technical College; the Grammar School, founded in 1662; the Art Gallery and Museum; St. Peter's Church; and Cartwright Hall. Bradford has been a center of the worsted industry of Great Britain for over six centuries. All kinds of woolen fabrics are produced here; p. 292,394.

**Bradford**, city, Pennsylvania. The district is one of the richest in the country in petroleum and natural gas, the latter affording lighting and heating facilities. There are flourishing manufactures, including those of oil-well implements, gas engines, boilers, refined oil, chemicals, wood alcohol, glass, brick, and toys; p. 17,354.

**Bradford, Amory Howe** (1846-1911), American clergyman, was a founder of the American Institute of Christian Philosophy, and took an active part in settlement work among the poor. He published many thoughtful volumes of a semi-religious, semi-literary character, including *Old Wine: New Bottles* (1892), *The Pilgrim in Old England* (1893), *The Age of Faith* (1900), *Spiritual Lessons from the Brownings* (1900), *My Brother* (1910), and *Preludes and Interludes* (1911).

**Bradford, Gamaliel** (1863-1932), American author, styled the 'father of the new biography,' though not superior in style. His works include *Types of American Character* (essays, 1895); *Confederate Portraits* (1914); *Union Portraits* (1916); *Portraits of American Women* (1919); *Damaged Souls* (1923); *The Soul of Samuel Pepys* (1924); *Saints and Sinners* (1932); *Journals of Gamaliel Bradford* (1933); *Letters of Gamaliel Bradford* (1934).

**Bradford, William** (?1589-1657), one of the leaders of the 'Pilgrim Fathers,' was born in Eng. While still a young man he identified

himself with the Separatists at Scrooby; in 1608 he accompanied them to Holland, and in 1620 he was one of the *Mayflower* emigrants. He wrote a *History of Plimouth Plantation*, which is indispensable to the student of the colony's history. Bradford's manuscript, after being long lost, was discovered in the library of the Bishop of London in 1855. The manuscript was returned, with much ceremony, to Massachusetts in 1897; it is sometimes incorrectly called the 'Log of the *Mayflower*.' Consult Willison, G. F., *Saints and Strangers* (1945).

**Bradford, William** (1663-1752), the first printer in Pennsylvania, was born in Eng. He emigrated to Pennsylvania in 1682; there in 1685 set up the first printing establishment in the Middle Colonies, and in 1693 removed to New York where he was the printer of the government for more than half a century. In 1725 he founded the *New York Gazette*, the first New York newspaper.

**Bradlaugh, Charles** (1833-91), social and political reformer, was born in London. His organ, *The National Reformer* (1862), was the subject of a futile government prosecution which led to the repeal of statutes still fettering the liberty of the press.

**Bradley, Henry** (1845-1923), Eng. lexicographer, b. in Manchester; joint-editor with Dr. Murray of the *New English Dictionary* (Oxford); wrote *The Story of the Goths*.

**Bradley, James** (1693-1762), Eng. astronomer. He discovered the 'aberration of light,' by which he accounted for the apparent displacement of the fixed stars; and the nutation of the earth's axis, due to the moon's unequal action on the equatorial parts. These discoveries laid the foundation of modern astronomy.

**Bradley, Omar Nelson** (1893- ), Am. general, born at Clark, Mo.; ed. at West Point; comm. gen. World War II; administrator, Veterans Affairs (1945-47); chief of staff, U. S. Army (1948-49); chairman, Joint Chiefs of Staff (1949-53).

**Bradshaw, George** (1801-53), originator of railway guides, an engraver in Manchester, England (1821). In 1839 appeared *Bradshaw's Railway Time-tables*, changed next year to *Bradshaw's Railway Companion*. The monthly *Railway Guide* dates from Dec., 1841. His other publications include the *Continental Railway Guide*, and the *Railway Directory and Shareholder's Guide* (1849).

**Bradshaw, Henry** (1831-86), English scholar, antiquary, and librarian, was born in

London. He unearthed the ms. of the famous *Book of Deer*, and rediscovered the Vaudois mss. (1862), containing the earliest remains of the Waldensian language and literature. In 1863 he assisted in the exposure of Simonides, the forger of the Codex Sinaiticus, discovered by Tischendorf in 1859. He also brought to light (1866) two previously unknown works ascribed to Barbour, *The Siege of Troy and Lives of the Saints*. His *Collected Papers* were published in 1889.

**Bradstreet, Anne** (c. 1612-72), daughter of Gov. Thomas Dudley of Mass., was born probably at Northampton, England, and came to America with her husband, Simon Bradstreet. Madame Bradstreet's poems were first published at London as *The Tenth Muse Lately Sprung up in America* (1650), and attracted attention as the first formal effort in verse coming from New England.

**Brady, Cyrus Townsend** (1861-1920), American clergyman, born at Allegheny, Pa.

**Brady, James Buchanan** (1856-1917), 'Diamond Jim' Brady, so-called because of his predilection for diamonds, of which he was said to have possessed 12,000 at his death. He was head of the Standard Steel Car Co., and of a large concern manufacturing machine tools, but he was best known as a sportsman and gambler.

**Brady, William A.** (1863-1950), American actor and theatrical producer, chairman of the Legitimate Theater Code Authority under NRA, 1933-1935. In 1899 he was married to Grace George, the actress.

**Bradycardia**, an abnormal slowness of pulse, which may be either peculiar to the individual or due to disease, exhaustion, pain, poisoning, or other cause.

**Braga**, the ancient *Bracara Augusta*, tn. of Portugal. It is a mediæval-looking place, still surrounded by walls, and has picturesque old houses, an imposing cathedral, large citadel, and archiepiscopal palace.

**Bragg, Braxton** (1817-76), American Confederate general, born in Warren co., N. C. In 1864 following an extended period of military leadership during the Seminole, Mexican and Civil Wars, he was called to Richmond, and appointed military adviser to Jefferson Davis.

**Bragg, Sir William Henry** (1862-1942), English physicist; studied crystalline structure by X rays; won Nobel Prize (1915).

**Braham, John** (b. 1774-1856), tenor singer, born in London of Jewish parents; had a long and successful operatic career; was the

original Max in Weber's *Der Freischütz* (1824), and the original Sir Huon in *Oberon* (1826).

**Brahé, Tycho or Tyge** (1546-1601), Danish astronomer. In 1572 he discovered a new star in Cassiopeia. In 1576 Frederick II., the Danish king, helped him to build and equip the observatory of Uraniborg, on the little island of Hven in the Sound, n. of Copenhagen. In 1599 he was invited to Prague by the Emperor Rudolph II. Tycho Brahé held that the planets moved round the sun, and the sun round the earth. This hybrid theory was expounded in the second volume of his *Astronomiæ Instauratæ Mechanica*, printed in 1598 (new ed. 1901). He discovered the variation and annual equation of the moon, investigated precession, and introduced a correction for refraction. His observatory of Uraniborg was excavated in 1901.

**Brahma**, the creator of the universe, according to Brahmanism; the first person of the Trimurti, or trinity, of Hinduism. See BRAHMANISM.

**Brahmanas**, those prose versions of the Vedas which describe the elaborate ritual to be observed by Brahmans. The oldest is supposed to have been written about the 7th century B.C.

**Brahmani**, riv. in India, famous in Hindu lore as the traditional scene of the love of the sage Parásara and the mother of Vyasa, reputed compiler of the *Vedas and the Māhābhārata*.

**Brahmanism or Brahminism**. The name given to the system which connects modern Hinduism with the religion of the Vedas. Its essence is twofold, the inspiration and divine authority of the Vedas, and the irreversible superiority of the Brahmans to all other castes. The rise of Brahmanism was due to two causes: 1. the claim of the Brahmans to ability to sacrifice more acceptably to the gods than any others; 2. this was founded on the other fact that as the language of the Vedas became obsolete, the Brahmans assumed the guardianship of the holy books, so that access to the gods was possessed by them alone. The caste system developed, separating the Brahmans from the Kshatriyas (warriors nobles), the Vaisas (husbandmen), Sudras (laborers) and no-castes or outcasts.

This system riveted the fetters with which the Brahmans bound all India. Its dominance has continued to the present except during the 800 years when Buddhism was supreme (B.C. 300-A.D. 500). A large part of the

immense literature of India is from their hands. A most elaborate philosophy, absolutely fearless in its pursuit of reasoning, has been developed with a profound logical and metaphysical apparatus. Out of a gross polytheism there was developed the most thoroughgoing pantheism the world has known. And with it a trinity in the discussion of which every variety of doctrine ever proposed in connection with the Christian Trinity was anticipated over and over.

See Browne, Lewis, *This Believing World* (1926); Hawkrige, Emma, *The Wisdom Tree* (1945); *The Upanishads*. 2 vols. (1949-52); Potter, C. F., *The Faiths Men Live By* (1954).

**Brahmaputra** (lit. 'son of Brahma or God'), one of the largest rivers of India. Its highest source, known as Tsangpo or Sanpo, is in Lake Manasarowar, in W. Tibet, the altitude being between 15,000 and 16,000 ft. It penetrates the Himalayas, under the name of Dihong, and descends to the valleys of Assam. There it assumes the name of Brahmaputra, flows in a s.w. and s. direction, and enters the Bay of Bengal in an expansive delta. Its length is about 1,800 m.

**Brahma Samaj** ('the Society of God'). The most remarkable religious revival of modern times in India has been that of the Brahma Samaj. Its founder, Raja Ram Mohun Roy, born in 1774, had studied the Philosophy of Hinduism at Benares and of Buddhism in Tibet. Denouncing *satī* and idol-worship, he sought to establish an eclectic system of practical morality. Although undoubtedly influenced by Christianity and Sufrite Islamism, it is important to note that the Hindu Unitarian Church which he founded (about 1830) was a return to a professedly ideal Brahmanism—the worship of a supreme deity, the essence of the universe. Allied to this movement of religious thought in India are other forms of Vedic theisms, among which may be mentioned the Prasthana Samaj (Prayer Society) of Bombay, and the Arya Samaj (Aryan Society): the latter, however, is rather a political organization than a religious body. See Illingston's *Indian Theism* (1901); Historical Sketch of Brahma Samaj; and Max Müller's *Ramakrishna* (1899).

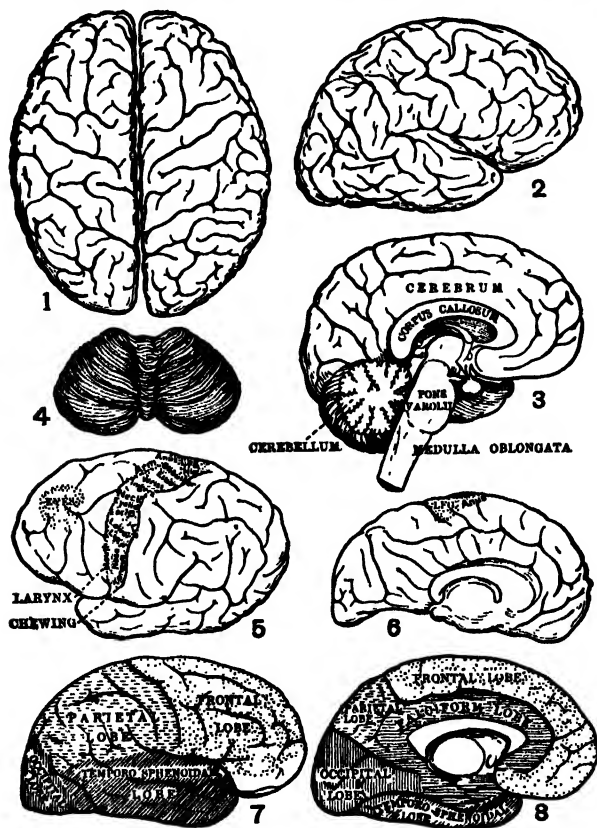
**Brahms, Johannes** (1833-97), an eminent composer and pianist, born at Hamburg. His music appeals more to the musician than to the multitude. In the development of his ideas the serious purpose and lofty aim of his work preclude any pandering to mere ear-

pleasing devices, and the superlative excellence of his compositions is only revealed to the trained intelligence of the cultured musician. His symphonies, overtures, and other orchestral compositions; also his productions in the domain of chamber music in all its forms, take rank with the greatest creations in their several classes of composition. His concertos, Hungarian dances, etc., for piano, and

**Braid, James** (?1795-1860), Scottish writer on hypnotism; was the first to use the term 'hypnotism'; wrote *The Rationale of Nervous Sleep, considered in Relation to Animal Magnetism* (1843); *Magic, Witchcraft, Animal Magnetism, Hypnotism and Observations on Trance* (1850).

**Braille, Louis.** See *Blindness*.

**Brain**, the organ of thought, sensation, and



*The Brain.*

1, Cerebrum from above, showing convolutions. 2, Right hemisphere. 3, Section through the center of brain. 4, Cerebellum. 5, 6, Motor areas of brain. 7, 8, Lobes of the right hemisphere, exterior and interior aspect.

his violin concerto (op. 77, written for Joachim), are works of conspicuous merit; while as a vocal composer in every form, and especially as a song-writer, Brahms occupies a position of almost unique distinction. Consult Goss, M. B., and Schauffler, R. H., *Brahms, the Master* (1943); Geiringer, Karl, *Brahms: His Life and Work* (2nd ed. 1947).

voluntary movement. It is protected by the skull, between which and the brain are delicate serous membranes (meninges) and a small quantity of fluid (the cerebrospinal fluid), which acts as a water-bed, lessening the shock of any blow. The brain is divided by anatomists into four principal parts—the *cerebrum* (brain proper), the *cerebellum*

(Lat. 'little brain'), *pons Varolii* ('bridge of Varolius'), and *medulla oblongata* (Lat. 'oblong marrow'). The cerebrum, or fore brain, is divided longitudinally into two cerebral hemispheres, the right and left by the great longitudinal fissure. This completely divides it, except where, towards the middle, the two

halves are joined by a broad band of white substance (nerve fibres) called the *corpus callosum* (hard body). The surface of each cerebral hemisphere is divided (arbitrarily) by anatomists into four lobes, marked off from one another more or less plainly by fissures of various lengths and curves.



*Brain Cells.*

1. From third cerebral convolution x 75:—*a*, Superficial layer with scattered cells; *b*, layer of small pyramidal cells; *c*, broader layer of pyramidal cells separated by radiating nerve fibres; *d*, narrow layer of small irregular cells; *e*, layer of fusiform cells in medullary center. 2. Large cells from the gray cortical layer of the cerebellum x 230. 3. Ganglion cells of various sizes from the gray matter of the cerebral hemisphere. 4. Vertical section of the gray matter of the cerebellum x 75:—*a*, Superficial (molecular or fibrillar) layer; *b*, second layer=ganglion cells of Purkinje; *c*, nuclear layer; *d*, white substance. 5. Basket-work fibres round the cells of Purkinje.

Broadly speaking, the cerebrum is made up of gray matter (cells which in groups form centres for thought, action, or sensation) and white matter (nerve strands acting as lines of communication). The surface of the cerebrum, in fact of the whole brain, is covered with gray matter—*i.e.* brain-cells, or centres—and owing to the arrangement of the surface in convolutions, the gray matter dips into the fissures and *sulci*, and so covers a larger area than it would were the brain uniformly smooth. Islands of gray matter are also embedded in the white. The cerebrum forms the largest part of the brain, and contains what are commonly spoken of as the 'higher centres'—*viz.* those for the higher or thinking faculties. This seems beyond question, although many higher centres cannot be exactly localized. The whole brain is supplied with blood from the two internal carotid arteries and two vertebral arteries. There is also a circulation of lymph; each cell of gray matter lies bathed in lymph.

From experiments made by Ferrier, Horsley, and others, those parts of the gray matter (cerebral cortex) concerned in certain actions have been mapped out roughly. The centres for movement of one side of the body lie on the opposite side of the brain. Thus, the right hand is guided by the left cerebral hemisphere. Motor areas—*i.e.* areas of the gray brain covering, apparently necessary for voluntary movement—have, until recently, been supposed to lie about the fissure of Rolando, on both sides of it. It has been stated by some observers that these motor areas lie entirely in front of the fissure of Rolando, and dip into the fissure, but do not cross it.

The cerebellum, or little brain, lies under the after part of the cerebrum, and is connected with that and other parts of the brain by processes called *crura* (legs). Disease of certain parts (lobes) of the cerebellum is believed to affect equilibration (balancing) and co-ordinated (controlled) movements. Some of the nerve fibres (white matter) are believed to be concerned in muscular sense (the sense of weight when exerting a group of muscles in lifting), but the function of the greater part of the cerebellum is unknown.

The pons Varolii is made up mostly of bundles of nerve fibres joining the higher parts of the brain with the medulla. The cerebrum lies above it and the cerebellum lies behind it, and the medulla oblongata below.

The medulla oblongata (sometimes called the spinal bulb) is the expanded upper end of the spinal cord. Of its nerve fibres, some

run through the pons Varolii into the cerebrum, while others run directly into the cerebellum. In it there is also gray matter, which forms various collections of cells known as the vital centres. These work independently of the will, and govern respiration, the heart's action, the constriction of blood-vessels, swallowing, and secretion of saliva. The last six of the twelve pairs of cranial nerves (nerves emerging from the cranium or skull) arise in the medulla. When the medulla is cut all sensation is lost, because all impulse fails to reach the cerebrum. All voluntary movement is abolished, because the cerebrum cannot send down a message. Death immediately follows, because of interference with the impulses by which heart and lungs are kept in action.

The base of the brain, resting on the base of the skull, the floor of the cavity which holds the brain, gives off cranial nerves in twelve pairs, each cranial nerve arising from a spot on one half of the brain corresponding to that from which its fellow arises on the other half, and each being traceable to a similar centre. Certain special centres (not for cranial nerves) are apparently single. Such is the speech centre, low down on the gray matter in the front of the left cerebral hemisphere.

Diseases of the brain result from disturbances of the circulation, inflammations following infections, injury, hemorrhages, degeneration, sclerosis, softening, malformations and disorders called functional. See D. J. Cunningham, *Textbook of Human Anatomy*; Quain's *Elements of Anatomy*, vol. iii, pt. 1; H. Woodard, *Recent Advances in Anatomy*.

**Brain Coral** (*Meandrina*), one of the madreporian or reef-forming corals, which has the surface of the corallum curiously convoluted, so that in the surface view of a dead mass it somewhat resembles the human brain.

**Braintree**, tn., Mass., has the Thayer Library, and is the seat of Thayer Academy. The portion of old Braintree now included in Quincy, was the birthplace of John Adams, John Hancock, and J. Q. Adams; p. 23, 161.

**Braithwaite, John** (1797-1870), English engineer, born in London; devised the donkey engine in 1822. In 1829, in conjunction with Captain John Ericsson, he constructed for the Stephenson's locomotive engine the 'Novelty,' the first that ever ran a mile within a minute. He also manufactured the first practical steam fire-engine; and in 1833,



with the assistance of Ericsson, he built the caloric engine.

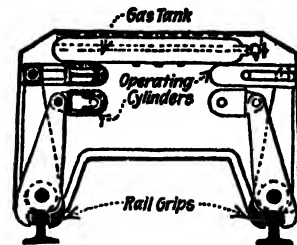
**Brake**, or **Bracken**, a popular name for the ferns of the genus *Pteris*. Its stem is a wide-spreading underground structure, covered with fine brown hairs, and giving off roots in all directions; this stem sends up each year a single leaf or frond, which may vary in height from six inches to twelve ft., according to the conditions in which the plant is growing. The spore cases occur in lines along the margin of the pinnæ. At the summit the leaf-stalk bears three branches, which are bipinnate; the pinnules are again pinnatifid, so that the frond has a broad, triangular effect.

**Brakes** are devices for arresting motion or for absorbing energy. The former are familiar in their use on ordinary vehicles, railway cars, and street cars. They are also necessary on elevators (lifts), on hoisting engines and appliances, and on inclined railways or cableways. There is a large variety of different forms for these various uses, and hand, steam, air, hydraulic, or electric power may be utilized for working them, often in conjunction with springs. Of course, all these brakes absorb power, but their direct function is to reduce excessive speed, or bring a moving machine to a stop. Absorption brakes (used in engine testing), however, primarily absorb energy (by converting it into heat), the engine running at uniform speed. The Prony brake, rope brake, and hydraulic brake are used for this purpose. They are also called absorption dynamometers. For brakes of this class see DYNAMOMETER.

Sand tracks, used on railways consist simply of a layer of sand over the track, 1 to 3 ins. deep over top of rail, which checks the wheels. Shoe brakes exclusively are used for railway cars. The prototype (hand operated) is seen on ordinary vehicles. Railway car brakes are operated by hand and by power (steam, vacuum, compressed air). Street railway cars mainly use hand and air operated shoe brakes, but occasionally track brakes are employed, and electric cars may always be braked electrically through the motors. Band brakes are used on automobiles exclusively, and on hoisting-engines, crane motors, and electric elevator motors. Disk brakes have been tried for street cars, but have been abandoned. The best example of the disk brake is found in the speed-governor of the phonograph, where a fly-ball governor presses against a friction disk when the correct speed is just exceeded. Eddy-current

brakes are used chiefly in electric meters, where they regulate the speed to the proper amount for correct registry. Track brakes are either simple friction shoes or gripping jaws. The best form of band brake consists of a metal or leather band completely encircling a smoothly turned hub or rim on the axle to be braked.

Railway vehicles, which have smooth iron wheels running on smooth steel track, may be braked only with a limited force, for so soon as the wheels are held hard enough to slip on the track, or skid, the braking effect on the train is much reduced. The automatic compressed-air brake meets these requirements almost ideally, and therefore it has been a prime factor in modern railway development.



*Gripping Track Brake.*—Compressed-Air safety clutch on incline railway.

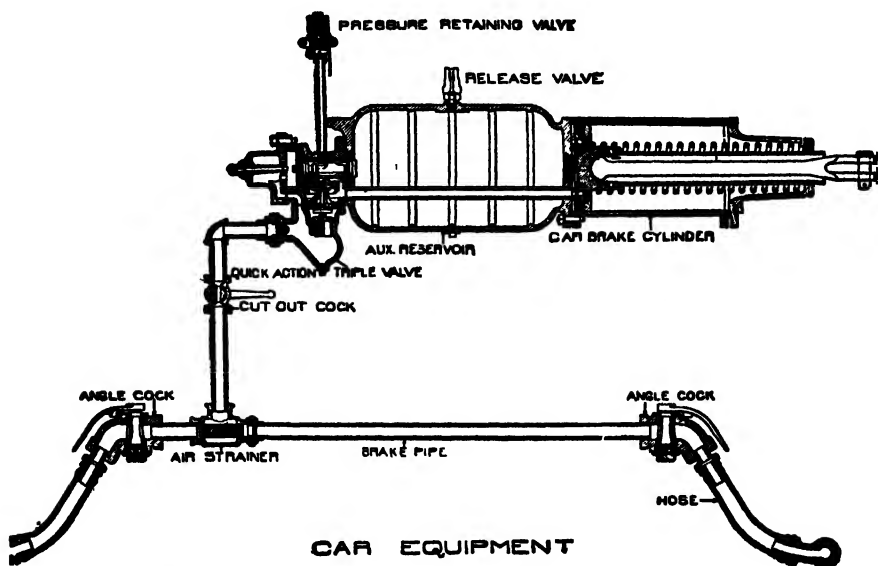
For braking a single car, and sometimes for braking short trains, the fundamental or straight-air system of compressed-air braking is used. Automatic brakes are used on long trains. The primary part of each car equipment includes brake cylinder and system of brake rods and levers (the brake rigging); this cylinder is not supplied directly from the train pipe, however, but from a storage reservoir on the car itself (auxiliary reservoir). Between reservoir and cylinder is interposed a highly ingenious multiplex valve, the famous 'triple valve,' which controls the admission of air to the brake cylinder and its release therefrom. This valve is set in action by pressure fluctuations in the train pipe, as follows:

The train pipe normally is full of compressed air, at reservoir pressure. The engineer of the train has at his hand in the engine cab a valve controlling this train pipe—the engineer's valve. Turning its handle closes off the train pipe from the main or pump reservoir, and opens an exhaust hole which releases air from the train pipe. Now

the train-pipe pressure falls, the wave of pressure-reduction passing through the train at high speed (with the velocity of sound). At each triple valve the pressure-reduction shifts a valve plug and opens temporary communication from auxiliary reservoir to brake cylinder. This sets all the brakes. For maximum rapidity of stopping the train in emergency (as to prevent collision), a further action is provided for: When the train-pipe pressure is reduced very sharply, by a large opening of the engineer's valve (or by an emergency valve contained in each car),

locomotive carries a small direct-acting, steam-driven compressor, started and stopped by a governor controlled by the pressure in the main reservoir. The locomotive has also a set of brake shoes and cylinder and valve like each car, but usually the locomotive brakes can be applied independently of those in the train.

A simple and useful brake for short trains is the vacuum brake, which acts somewhat in an opposite manner to the air brake. The brake cylinders work by having air exhausted from one side of the piston, so that the at-



*Detailed Diagram of the Air-Brake Apparatus on a Freight Car.*

The hose at either end of the car is coupled to the hose of the adjoining car, so that the train pipe becomes continuous throughout the train. The pin at the end of the brake-cylinder piston rod is connected with a lever adapted to pull the eight brake shoes (one on each wheel) against the wheel rims.

the plug of the triple valve is thrown farther than ordinarily, and opens a passage from train pipe to the atmosphere so as to still further release air from the train pipe and reinforce the pressure-reduction wave traveling along the column of air in the pipe. This action gives the maximum braking force, in the shortest possible time.

In the practical application of the automatic brake, every car must be equipped with a longitudinal air pipe under the floor, provided at either end with a short length of hose, terminating in a coupling, so that it can be connected up with the adjoining cars. The

atmospheric pressure on the other side moves the piston and thus applies the brakes. A steam ejector on the locomotive produces the vacuum in the train pipe.

Modern motor cars have commonly two sets of brakes, one set being used for ordinary purposes, and the other kept in reserve for emergency stops. The emergency brake is most often operated by a hand lever, with a pawl and ratchet to lock it in the applied position, and the other brake by a foot lever. See MOTOR CARS. So far, no form of brake has been devised for ships sufficiently successful to be generally adopted, although

system of wings or fins projected out into the water at right angles from the hull has been tried with modified success. Steamships, however, can reduce speed quickly by reversing their paddle wheels or propellers. In flying machines, a braking effect can be secured by tilting the height-control planes for a sudden rise.

**Brama**, or **Ray's Bream** (*Brama raiti*), a genus of bony fishes of the Chætodontidæ. In this genus the body is laterally compressed and more or less deep, the spinous portion of the long dorsal fin is not well developed, and the tail is deeply forked. Its total length may be as much as 2 ft. The flesh is said to be good eating.

**Bramah**, **Joseph** (1748-1814), English mechanical inventor, invented the hydraulic press that bears his name; patented a machine for printing bank notes which was adopted by the Bank of England; also devised improvements in locks, pumps, wheel carriages, engine boilers, fire engines, and paper making. Consult Smiles' *Industrial Biography*.

**Bramante**, **Donato d'Agnolo** (1444-1514), Italian architect. His chief works are the joining of the Belvedere Palace with the Vatican by means of two grand galleries (*Loggi*), and the rebuilding of St. Peter's at Rome, begun in 1506, and finished, with alterations by Michelangelo and others, after his death. Bramante stands at the head of the Renaissance architects of Italy. Breadth, mass, and classic grace are the principal characteristics of his style.

**Brambling**, or **Bramble Finch**, a beautiful little bird allied to the chaffinch, is occasionally caged for the sake of its song.

**Bramwell**, **John Milne** (1852-1925), Scottish physician, attracted attention by his publications on hypnotism and his treatment by suggestion. His works include: *Surgeon and Hypnotist*; *Hypnotic Anæsthesia*; *Suggestion, Its Place in Medicine and Scientific Research*.

**Bran** is the material obtained from the outer covering or husk of grain during the process of grinding, and which is separated from the finer flour before the latter is made into bread. It is generally met with in commerce in thin, scaly, yellowish-brown particles, with sharp edges. Wheat bran is the most common kind, although rye, corn, and rice brans are sold in considerable quantities.

**Bran**, a name in Celtic legend variously associated with the hero of the Welsh *Mabinogion* of *Branwen*, the hero of the eighth-

century Irish epic, *The Voyage of Bran*, and the dog in Ossian's *Fingal*.

**Branchidæ**, an ancient town near Miletus, on the coast of Asia Minor, famous for its temple and oracle of Apollo Didymæus.

**Branching**. When any part of a plant gives rise to second parts similar to itself, it is said to *branch*. Thus, a stem forms stem branches, and a root forms root branches. More strictly, however, the term is restrained to the ramification of stems. The growing point in many cryptogams forks constantly, while in the higher plants we have a potential branch in every vegetative bud except the terminal one which continues the main axis.

The general aspect of trees depends more upon their mode of branching than the form of exuberance of their foliage. The angle at which branches come off varies largely; usually ascending and acute, they may be at a right angle or even droop, as in 'weeping' trees. Branches may arise either from the sides of the parent structure (*monopodial branching*), or from division of its growing apex (*dichotomous branching*). In the former case the branch or branches may remain subordinate in size and position to the parent axis (*racemose branching*), or may displace and overtop it (*cymose branching*).

In the common lilac, a very similar mode of annual cymose branching may be observed; but in this case the branches are arranged in pairs and the last pair of buds formed in each year grow equally, forming two main axes of the second year, while the prolongation of the preceding main axis dies.

The underground branches of a rhizome are often thickened as *tubers*; or they may send up tertiary branches to become new ascending axes—the *suckers* of the raspberry or rose. A *stolon* is a prostrate branch which roots at the tips and then develops an ascending branch; it may often be long and thread-like, and is then called a *runner* (strawberry).

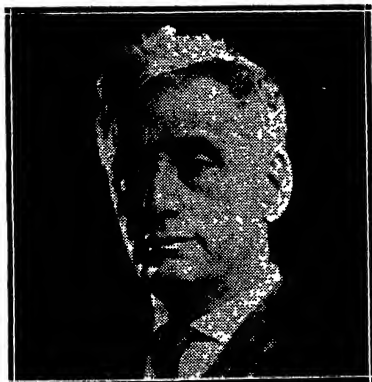
**Branchiopoda**, a sub-order of Crustaceans in the order with leaf-like feet (Phyllo-poda). The name ('gill-footed') refers to the fact that many of the numerous (10-40 pairs) appendages bear respiratory appendages.

**Brand** is the mark made upon the skins of cattle for the purpose of recognition by the owner, and is produced by searing with a hot iron; or a mark made in the same way on a cask or box for trade or excise purposes. New methods of branding have recently been devised which are less painful to the cattle.

**Brandeis**, **Frederick** (1835-99), Austro-

American composer and musician, was born in Vienna. His orchestral compositions include *Dulce est pro Patria Mori* and *Prelude to Schiller's 'Maria Stuart,'* and many pieces for the organ, piano, and voice.

**Brandeis, Louis Dembitz** (1856-1941), American jurist and U. S. Supreme Court Justice, was born in Louisville, Ky. He was counsel for the people in the proceedings involving the constitutionality of the women's ten-hour laws in Oregon and Illinois, the California eight-hour law, and the minimum wage law in Oregon; and for the Massachusetts savings banks insurance. In 1910 he was chairman of the arbitration board in the New York garment workers' strike. He was appointed by President Wilson in 1916 to succeed Justice Lamar, deceased, as Associate Justice of the U. S. Supreme Court—the first Jew to hold that office. The character of some of his decisions on the Supreme Court bench quickly ranked him in the popular mind with the so-called 'liberal group' of Justices. He retired in 1939. Consult A. T. Mason's *Brandeis: A Free Man's Life* (1946).



*Louis Dembitz Brandeis.*

**Brandenburg**, state in Germany, occupying the middle of the North German plain. Fruit, flax, hemp, and vines are cultivated. In the south, forests cover thirty-two per cent. of the area. Lignite is mined as well as iron, lime, and gypsum. The chief manufactures are cotton, wool, linen, sugar, glass, tiles, and machinery. There are also numerous distilleries; p. 2,592,430.

**Brandenburg**, town, province, Brandenburg, Germany, on the River Havel; p. 70,632.

**Brandes, Carl Edvard Cohen** (1847), Danish author, brother of Georg Brandes, distinguished himself early as an Orientalist

and original dramatist, has written several plays—*Lägemidler* (1881), *Et Besøg* (1882), *Under Loven* (1890).

**Brandes, Georg Morris Cohen** (1842-1927), Danish author and literary critic, of Jewish extraction, was born in Copenhagen; he published *Aesthetic Studies*, *The French Aesthetics of Our Day*.

The influence of Brandes in Scandinavia and on the Continent has been incalculable. His great accomplishments have been the breathing of a new spirit into Danish literature and the substitution of a scientific method of criticism for narrow traditional standards of literary value.

**Branding** primarily denotes the impressing of a mark with hot iron upon men, beasts, or inanimate objects. From early times it was customary to brand felons and slaves with certain marks, which, being indelible, distinguished them for life from their fellow men. Hence the secondary application of 'brand' and 'stigmatize.' The Greeks marked their slaves with the *stigma*; in Rome runaway slaves (*fugitivi*) and thieves (*fures*) were branded with the letter F., and slaves and convicts were also branded on the forehead for identification.

**Brandling** (*Lumbricus fætibus*), an earthworm remarkable for its banded body. It is a small species, and much prized by anglers as bait.

**Brandon, Richard** (d. 1649), succeeded his father as public executioner (1640) of England, and is said to have beheaded Charles I., Strafford, Laud, and others.

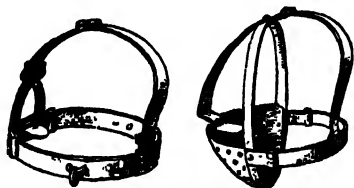
**Brandy** (German *Branntwein*, 'burnt wine'; French *eau de vie*), a spirit prepared by the distillation of wines, the quality depending not only on the process, but also on the wine.

The fermented liquors or wines which are employed for the purpose are various, and contain a proportion of alcohol which runs from 10 to 25 per cent. of their weight. In the red wines generally are preferred. In the 17th century French brandy was made only from white wine. About 1,000 gallons of wine give by distillation from 100 to 150 gallons of brandy, which varies in strength, but is generally diluted with water. When originally distilled, brandy is clear and colorless, and if wished to remain so, is received and kept in glass vessels; but when placed in wooden casks the spirit dissolves out the coloring matter of the wood, and acquires a light sherry tint, which may be deepened by burnt sugar and other coloring matter.

It contains from 47 to 80 per cent. of alcohol, the average being about 54 per cent. The most famous brandy is that distilled in the country round *Cognac*, in Charente, in the west of France. *Armagnac* is the brandy of another French district. The Germans use the name *Branntwein* for all kinds of grain spirit, or that distilled from plums, blueberries, etc. *Kirschwasser* or *kirschbranntwein* is distilled from cherries and their kernels. In the United States, brandy is also manufactured from cherries, apples, pears, peaches, and other fruit. A genuine brandy may be defined as one distilled from grape wines by a pot still. The best comes from the Charentes in France; but California, Australia, Spain, Algeria, Greece, Egypt, and Canada all export brandy. See ALCOHOL; WINE.

**Brandywine, Battle of.** Brandywine Creek, near Chadd's Ford, 50 m. from Philadelphia, was the scene of one of Washington's defeats. Here the British, under Howe and Cornwallis, forced him to retreat and abandon Philadelphia (Sept. 11, 1777).

**Brangwyn, Frank** (1867), English painter and etcher, was born in Bruges, Belgium. He became president of the Royal Society of British Artists, and a member of the National Academy. His *Trade on the Beach* (1895) is in the Luxembourg, Paris; *The Scoffers* in the Sydney National Gallery; *St. Simon Stylites* in Venice; and his panel *Commerce* in the Royal Exchange, London. In 1915 he decorated the East Pavilion of the Panama Exposition. Consult S. Sparrow's *Frank Brangwyn* (1910).



*Specimens of Branks.*

**Brank** (in England), or **Branks** (in Scotland), a kind of bridle made of iron bands, formerly used to punish scolding women and those guilty of slander. Nearly all dated specimens in British museums belong to the 16th and 17th centuries.

**Branly, Edouard** (1844-1940), French scientist, born in Amiens. He has made numerous important researches in the field of electricity, including the invention of a valuable wireless telegraph receiver. For his wireless in-

vestigations he was made a Chevalier of the Legion of Honor, and Pope Leo XIII. invested him with the Order of Commander of St. Gregory the Great.

**Brannan, Charles Franklin** (1903- ), American government official, born in Denver, Colo., and educated at the University of Denver. After practicing law in Denver (1929-35), he was Regional Attorney, U. S. Dept. of Agriculture (1937-41); Regional Director, Farm Security Administration (1941-44); Assistant Secy. of Agriculture (1944-48); and Secy. of Agriculture (1948-53).

**Brant** (*Branta bernicla*), a small species of wild goose breeding among the Arctic Islands, and wintering along the Atlantic Coast of Europe and of North America as far s. as North Carolina. It measures from 23 to 26 inches in length. The Black Brant (*B. x. gricans*) is a Pacific Coast species similar to the common brant.

**Brant, Joseph (Thayendanegea)** (1742-1807), a noted Mohawk Indian chief. He fought with the English against the French in the French and Indian War, and against Pontiac in 1764. Becoming a missionary of the Church of England among his people, he translated the *Prayer Book* into the Mohawk language. In the American Revolution he received from the English a commission as colonel. He is said to have founded the first Episcopal Church ever established in Canada. Consult Stone's *Life of Joseph Brant*; Eggleston and Seelye's *Brant and Red Jacket* ('Famous American Indians').

**Brant, or Brandt, Sebastian** (1457-1521), German poet and humanist, went to Basel in 1476; became licentiate of canon law and doctor of law, and in 1501 returned to Strassburg, his native city, which he served, first as syndic and later also as town clerk, until his death. He wrote many works both in Latin and German, in prose and verse, popular and learned. The most successful of these was his famous satire *Narrenschiff* (1494).

**Brantford**, city, Ontario, Canada, county seat of Brant-co., on Grand River, 25 m. s.w. of Hamilton. The city's electrical power is supplied from Niagara Falls. Brantford was founded in 1823 and named in honor of Joseph Brant, the famous Mohawk chief, to whose memory a monument was erected in Victoria Square in 1887; p. 36,727.

**Branting, Karl Hjalmar** (1860-1925), Swedish statesman, leader of the Social Democratic Party, was born in Stockholm. He was premier of Sweden from March to De-

ember 1920, and was again elected to that position in October 1921. He was Swedish delegate to the League of Nations Assembly 1920-22, and received the Nobel Peace Prize in 1921.

**Brantôme, Pierre de Bourdeilles, Seigneur de** (1540-1614), French chronicler, was born in Périgord, of a noble family. He fought in many wars and was chamberlain to Charles IX. and Henry III.; but after the death of his patroness, Catherine de' Medici, he retired to Brantôme, and wrote his famous *Mémoires*.

**Bras d'Or, Lake**, a gulf, Cape Breton Island, Canada, 50 m. long by 20 m. broad. The s. end is connected by a ship canal with St. Peter's Bay, thus bisecting Cape Breton Island.

**Brashear, John Alfred** (1840-1920), American manufacturer of astronomical and physical instruments. In 1870 he began constructing astronomical instruments. He was acting director of the Allegheny Observatory, and acting chancellor of the Western University of Pennsylvania (now of Pittsburgh).

**Brasidas**, son of Telli, was the most famous and successful Spartan commander in the earlier part of the Peloponnesian War. He saved Methone from an Athenian invading force (431 B.C.), became ephor, and distinguished himself at Pylos in 425 B.C. In 422 B.C. he gained a complete victory over an Athenian force under Cleon which was attempting to recover Amphipolis, but fell in the battle.

**Brass**, an alloy of copper and zinc in various proportions. The alloy was known to the Romans, though bronze, the alloy of copper and tin, was the material most used by the ancients. Brass is prepared by fusing the metals in the proportions of about three of copper to from two to one of zinc in plumbago or clay crucibles. Sheet brass is prepared by casting into strips, and these are passed cold through rolls. The proportion of the two metals varies greatly according to the uses to which the alloy is to be put. A large proportion of zinc increases the lightness of the color, but reduces the tenacity and ductility of the alloy. Brass is highly tenacious, malleable, and ductile, and makes good castings. The addition of two to four per cent. iron gives a very hard and tenacious metal. Brass fittings in machinery are used for the bearings in which a revolving journal lies. This comparatively soft metal is introduced so that the shaft may not wear away.

**Brasseur de Bourbourg, Charles Etienne** (1814-74), French abbé, was born in Bourbourg. Proceeding to the United States in 1846, he was vicar-general at Boston, then a missionary (1848-64) in Central America and Mexico. He was the author of *Histoire de Canada* (1851), and other works dealing with the Maya civilization.

**Brassey, Thomas** (1805-70), English engineer and railway contractor, was the son of a Cheshire farmer. In 1836 he moved to London, and began business in a large way as a railway contractor. In 1847 and following years he constructed the Great Northern Railway, as well as railways in France, Italy, Spain, Canada, Australia, and India, the Crimean Railway, the Victoria Docks, London, and the East London Railway.

**Brassey, Thomas**, First Earl (1836-1918), son of Thomas Brassey, was born in Stafford, England. He became a civil lord of the Admiralty in 1880, and was secretary to the Admiralty in 1883-5. He was founder and for a number of years editor of the *Naval Annual* and author of *Work and Wages* (1872), etc. He was made K.C.B. in 1880 and baron in 1886. He was president of the Institute of Naval Architects in 1893-5.

**Brassica**, a genus of plants belonging to the Cruciferae and including the numerous varieties of Mustard, and of the Turnip, Rape, Cabbage, Cauliflower, Kale, and Kohlrabi.

**Brathwaite, Richard** (1588-1673), English poet, was born in Westmoreland, and lived there and in London. He was a prolific writer. His best known work, *Barnabæ Itinerarium, or Barnabee's Journal* (1638), also known as *Drunken Barnaby's Four Journeys*, was published under the pseudonym of Corymbæus.

**Bratianu, Jon** (1866-1927), Rumanian statesman, son of Jon C. Bratianu. He was educated in Bucharest and in Paris, entered upon a political career, and became the leader of the Liberal party. He was premier of Rumania in 1907-10, 1914-18, December 1918-November 1919, and was again elected in January 1922. He was Rumanian delegate to the Paris Conference in 1919.

**Bratianu, Jon Constantin** (1822-91), Rumanian statesman, was born in Pitesti, and was educated in Paris, where he took an active part in the revolution of 1848. In 1866 he took a prominent part in calling to the Rumanian throne Prince Charles of Hohenzollern. From that time he was the

leading statesman in the country, being prime minister from 1876 to 1888, a period during which Rumania took part in the Russo-Turkish War of 1877-8, became independent of Turkey, and was raised to the status of a kingdom (1881). In 1878 Brati-anu represented his country at the Congress of Berlin.

**Bratsberg**, mountainous and picturesque county on the southern coast of Norway; area, 5,865 sq. m. The chief town is Skien; p. 108,100.

**Brauchitsch, Heinrich Alfred Walther von** (1881-1948), Ger. army officer; lieut. Royal Elizabeth Guard Grenadiers, 1900; served on General Staff (1914-1918); director of training, 1930; in charge of construction of East Prussia fortifications, 1936-39; commander-in-chief, 1938; lead army in victorious Polish and French campaigns, 1939-40; Field Marshal 1940-41.

**Braun, (Karl) Ferdinand** (1850-1918), German physicist, was born in Fulda. He studied at different German universities, completed his education in Scotland, and occupied professorships successively at Marburg, Strassburg, Carlsruhe, and Tübingen, where he directed the construction of the Physical Institute. His studies were devoted for the most part to electricity, magnetism, and telegraphy. In 1909 he shared with Marconi the Nobel Prize in Physics.

**Braun, Louis** (1838-1916), German battle painter, was born in Württemberg. He was official painter of the Franco-German war.

**Bravura**, (Ital.), a term applied to a style of musical composition or performance. It denotes florid brilliancy and technical dexterity.

**Brawling**, the common law offence of wilfully disturbing any meeting of persons lawfully assembled for religious worship, or of misusing any preacher, teacher, or persons so assembled. It is a misdemeanor, punishable by fine. See BREACH OF THE PEACE; ASSAULT.

**Brawn** (M. E. 'muscle,' 'boar's flesh'; akin to German *braten*, 'to roast'), a preparation of meat made from pig's head and ox feet, cut up, boiled, pickled, and pressed into a shape.

**Braxfield, Robert Macqueen, Lord** (1722-99), Scottish judge, was called to the bar in 1744. His coarseness and cruelty on the bench won for him the names of the 'hanging judge' and the 'Jeffreys of Scotland.' An excellent study of him is given in R. L. Stevenson's *Weir of Hermiston*.

**Braxton, Carter** (1736-97), signer of the Declaration of Independence, was born in Newington, Va., and received his education at William and Mary College. A wealthy man, he nevertheless embraced the patriot cause at an early period; was a supporter in the Virginia House of Burgesses of Patrick Henry's Stamp Act resolutions (1765); and took an active part in the Williamsburg convention (1774).

**Braxy, Braksy, Braxes, Braxit, Bracks**, or **Braasot**, a name applied loosely to various animal diseases, but more strictly to a disease of sheep, sometimes known simply as 'the sickness.' This disease is due to the ingestion of the *Bacillus gastrumycosis ovis*, and is most prevalent in cold weather. The animals affected, usually from one to three years old, lose control over their limbs, are seized with convulsions, and die in from one to six hours after the appearance of the first symptoms of the disease.

**Bray, Thomas** (1656-1730), English divine and philanthropist, was born in Marton, Shropshire, England. He devoted himself to a scheme for establishing parochial libraries, and had such success that before his death eighty had been founded in England and thirty-nine in America. Out of his library scheme grew the Society for Promoting Christian Knowledge; and he may also be regarded as the founder of the Society for the Propagation of the Gospel.

**Brazen Head**, a mechanical contrivance which was fabulously reputed to possess the power of human speech, and to be capable of acting as a kind of oracle.

**Brazen Serpent**, the figure which Moses set up before the Israelites, to heal those who had been poisoned by the serpents. It was destroyed by King Hezekiah after it had become an object of adoration.

**Brazil, United States of**, republic, South America, the largest state in South America and the fifth largest in the world, lies between latitude 4° 22' N. and 33° 45' S., and longitude 34° 40' and 73° 15' W. The greatest length is 2,660 m.; the greatest breadth, 2,900 m.; and the area approximately 3,288,050 sq. m. The most important harbors are Rio de Janeiro, Santos, and Bahia.

Brazil is a triangular-shaped country, occupying the eastern angle of the continent. It lies almost wholly within the tropics, and is still in many parts unexplored and unsettled. On the N. and W. are the great depressions of the Amazon and Paraguay

Rivers, which comprise large areas of flood plains and swamps, heavily wooded. The upper coast is bordered by low, alluvial bottom lands and sandy plains, full of lakes, and in places very sterile; while the southern angle of the country is rolling *campo* land, bordered by a low, sandy coast.

The interior of the country is a high plateau, with a general elevation of 1,000 to 3,000 ft., irregularly ridged by mountains and deeply cut by large rivers. The mountainous ranges of the maritime system form the eastern margin of this plateau, the easternmost of which is known as the Serra do Mar. This range plays an important part in the development of Brazil, for it is a costly barrier to communication with the interior, and turns nearly all the great rivers inland to find outlets through the distant Amazon and La Plata. Large lakes, caused by the expansion of the rivers, are common in the Amazon basin. On the plateau they are also numerous; one of the largest (100 m. long by 25 broad) lies on the island of Bananal, in Goyaz. Brazil possesses a fine climate, with mean temperature of 63° F., and a rainfall, chiefly in winter and autumn, of 40 to 60 inches. No comprehensive study has been made of the geology of Brazil. Indications, however, show that the prevailing rocks throughout the country are of Archaean formation, and that Brazil is geologically one of the oldest parts of the South American continent. The vegetation of Brazil is luxuriant and varied. The vast forests of the Amazon contain hundreds of species of trees, draped and festooned by climbing plants, lianas, orchids, etc. As regards fauna, Brazil occupies almost the whole of a sub-region of the neotropical region which extends from Mexico to Tierra del Fuego, and contains nearly all its characteristic types. The birds are numerous (1,700 varieties) and of brilliant plumage. There are 180 varieties of snakes, of which 20 are venomous, and insects are innumerable.

Brazil has vast forest regions, that of the Amazon alone covering over 2,000,000 sq. m.; and it has an abundance of valuable woods, as pine, cedar, mahogany, and ebony. The waters of Brazil abound in fish of all kinds, Agassiz having discovered over 2,000 varieties in the Amazon alone. Comparatively little has been done to exploit the Brazilian mines. Minas Geraes and Bahia are the chief mining regions, yielding diamonds, gold, iron, manganese, and monazite. A large part of the monazite sand of the world comes from

Brazil. Agriculture, which is encouraged by the state governments, is the principal occupation of the people, and agricultural products form the major part of the exports. On the Upper Amazon the chief occupation is the collection of india rubber, mostly wild. The world obtains its best rubber, the Pará variety, from Brazil, but the production has declined enormously in recent years. In the Atlantic states, farming is most developed. Coffee, the chief product, occupies about 5,500,000 acres, the chief districts being the states of São Paulo, Rio de Janeiro, Espírito Santo, and Minas Geraes, which comprise, together, about one-eighth of Brazil. Four-fifths of the world's supply of coffee comes from this region, more than one-half the coffee of the world coming from São Paulo alone. Brazil ranks next to the Gold Coast of Africa among the countries of the world in the production of cacao. Sugar is grown principally in the n.e., and cotton thrives in nearly all the states except in the Amazon Valley and the extreme s. Wheat cultivation has been successfully followed, chiefly in Rio Grande do Sul and no fewer than fifteen varieties of rice are grown. Corn, beans, peas, sweet potatoes and lentils are extensively cultivated and tropical fruits thrive abundantly on the rich soil. The vast plains furnish excellent facilities for stock raising, and rapid strides are being made in this industry. The manufacturing industry is largely confined to the states of Rio de Janeiro, Bahia, São Paulo, and Rio Grande do Sul, and to the Federal District. The textile industry is the most important manufacturing industry and the manufacture of sugar is also an important industry.

The most densely populated parts are the coastal regions and the adjoining valleys, together with some districts in the interior of Minas Geraes and the southern states. The population is mixed, the approximate proportions being, Europeans, 45 per cent.; Indian half breeds, 32 per cent.; Negroes, 15 per cent; pure Indians, 8 per cent. Total p. about 55,772,000.

The Roman Catholic was the established religion under the empire; under the republic there is no state church, and all sects are tolerated. Except for some 100,000, however, all the people are Catholics. Brazil has one official university in Rio de Janeiro, there are two private universities, at Manaus and Curitiba. Much attention has been given to agricultural education, which is provided in the Superior School of Agriculture.



in Rio (established 1913), and in four other agricultural schools.

Under the empire the government of Brazil was a constitutional monarchy. At the revolution of 1889 the empire became a republic, and in 1891 the present constitution was proclaimed by a national congress convoked by the provisional government. The United States of Brazil are a federative republic, each of the old provinces and the Federal District forming an organized state administering its own affairs at its own expense, and having distinct administrative, legislative, and judicial bodies. But the Federal Government takes charge of national defence, public order, and federal law, as well as customs, stamps, postal arrangements, and the issue of bank notes. The Republic consists of 20 states, a Federal District, and the Federal territory of Acre. The national congress, the legislative authority, consists of a Chamber of Deputies and a Senate, which meet annually, and the president's sanction is required to new laws.

The president has supreme command of army and navy; has power to declare war and make peace, within certain defined limits; appoints and dismisses ministers, and, with the assent of Congress, appoints ambassadors and the judges of the Supreme Federal Court. The Cabinet consists of the Ministers of Foreign Affairs, Justice, Interior and Public Works, Agriculture, and Industry and Commerce. There is a Supreme Court of 15 members. All male citizens of twenty-one years, duly enrolled, exercise the franchise, except illiterates, beggars, soldiers in service, and monastics under vows.

The national capital is Rio de Janeiro, in the Federal District.

As early as 1480 expeditions sailed from Bristol in search of the island of Brasylle, rumored to exist in the western seas; Brazil was discovered on Jan. 26, 1500, by Vincent Yañez Pinzon, who landed at Cape St. Augustine, near Pernambuco, and then followed the coast n. to the Orinoco. Two Portuguese expeditions were sent out in 1501 and 1503, the first exploring the coast from 5° to 32° s. lat., and the second planting a colony and bringing back a rich cargo of Brazil-wood, which gave this name to Portugal's new possession. In 1567 a Huguenot colony, established on the bay of Rio de Janeiro twelve years before, was overthrown by the Portuguese, who then founded the present capital of Brazil. The Dutch in the early 17th century succeeded in gaining control of the

northern part of the country; and the Dutch-Portuguese alliance of 1641 delimited their respective territories. The Dutch colonists were driven out by the Portuguese in 1654, however; and by a treaty concluded in 1661, the Netherlands gave up all claim to Brazilian territory in consideration of the payment by Portugal of 8,000,000 florins.

In 1808 the royal family of Portugal was expelled by the French and took refuge in Brazil, and the first act of Dom João VI. was to open Brazilian ports to foreign commerce. He then removed various restrictions on domestic industries. All these acts greatly stimulated the growth of the country. In 1821 he returned to Portugal, leaving his eldest son in Brazil as prince-regent.

Personal ambition, and the advice of men opposed to government from Lisbon, led the young prince to declare for Brazilian independence (Sept. 7, 1822). He was proclaimed and crowned emperor—as Dom Pedro I., and before the end of the year the small Portuguese force in the country was quickly and easily expelled. Vexed with the opposition encountered, Dom Pedro voluntarily abdicated in 1831 in favor of his eldest son, and withdrew to Portugal. A popular agitation led to the declaration of the young prince's majority, at fifteen years of age, and to his coronation the following year as Dom Pedro II. In 1888 an emancipation proclamation liberated all slaves within the empire, but failed to provide compensation for their owners. This act alienated the aristocratic slave-holding class, and hastened the revolution of November, 1889, by which the empire became a republic. Dom Pedro II. yielded to the will of the people, allowing himself to be dismissed from the country. He died in 1891. The republican form of government was inaugurated on Nov. 15, 1889, and a new constitution was adopted in 1891. General Fonseca became the first president of the new republic. The government for several years was occupied in suppressing revolt; but public confidence was restored by the wise and strong administration of President Moraes, and no serious trouble has been experienced since 1893. In 1914 ex-President Roosevelt headed a scientific expedition of exploration in the heart of Brazil. The outbreak of the World War (1914) exerted a disastrous effect on national finances, so great had been the value of German imports. For more than three years Brazil maintained neutrality, when the sinking of Brazilian ships by German submarines evoked a declar-

ation of war against Germany (Oct. 26, 1917). A Brazilian naval squadron coöperated with the Allies in European waters and Brazilian aviators joined the Allied armies. In 1922 Brazil celebrated a century of independence by an international exposition at Rio de Janeiro. A military revolt broke out Oct. 4, 1930, under the leadership of Dr. Getulio Vargas, Governor of the State of Rio Grande do Sul. President de Sousa was compelled to resign Oct. 24, and on the 30th Dr. Vargas assumed the provisional presidency.

In November, 1937, by promulgating a new constitution, Dr. Vargas made himself practically Dictator. A revolution against Vargas at Rio de Janeiro in May, 1938, was crushed within a few hours. Brazil declared war upon Germany in 1942. In 1946 still another constitution was adopted, and Gen. Eurico Dutra was elected pres., but in 1951 Vargas was returned to the presidency. In Aug. 1954 Vargas' resignation was forced and he committed suicide. Vice-President Joao Cafe Filho succeeded.

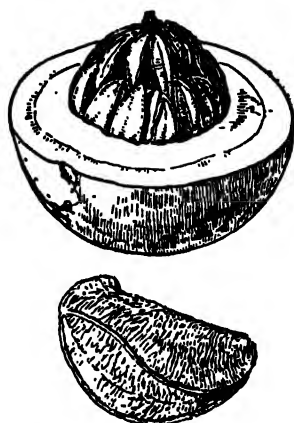
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**Brazilian Grass.** Strips from the leaves of a West Indian fan-palm (*Chamærops argentea*); exported chiefly from Cuba, and woven into cheap chip hats.

**Brazil Nut**, the seed of *Bertholletia excelsa*, a tree belonging to the Myrtaceæ, indigenous to Brazil, Guiana, and Venezuela, where it attains a height of 100 ft. or more. The fruit is a hard, hollow shell, nearly spherical, and about six inches in diameter. These fruits are borne in large numbers on the upper branches of the tree; when ripe they fall off, open by the removal of a small lid, and expose from twelve to twenty-two nuts. The nuts are ridged and angular, owing to the way in which they are packed in the fruit, and contain within the hard shells a pleasantly flavored, edible, white kernel from which an oil is pressed for burning.

**Brazil-wood** is the name given to a number of red-dye-yielding woods growing in Brazil, the W. Indies, and Japan. They were at one time largely employed in dyeing, but have now been replaced by aniline colors. Brazil-wood is generally sent to market in the form of sawdust.

**Brazos**, one of the largest rivers of Texas. It rises in the Llano Estacado, in the w. part of the state, and flows to its mouth in the Gulf of Mexico. Length, 900 m.; navigable at high water for 300 m.



*Brazil Nut, Fruit (cut open), and single Nut.*

**Brazza**, Pierre Paul François Camille, Comte de (1852-1905), whose real name is BRAZZA-SAVORNAN, African explorer, of Italian parentage, was born on board a vessel in the harbor of Rio de Janeiro, and educated at the Jesuits' College at Paris and the Naval School at Brest. He was sent in 1875 to explore the Ogowe R., in W. Africa. In 1879-80 he again explored the same region, and set up two important scientific stations, Franceville and Brazzaville (n. shore Stanley Pool), and twenty-five other posts, establishing France's claim to the territory about Stanley Pool before that explorer had appeared there. In 1886 he became commissary-general of the French settlements in W. Africa, in 1888 governor-general of French Congo, and in 1891 he explored the Sangha. In February, 1905, he was appointed by the French government to investigate the charges of cruelty against natives in the French Congo region.

**Breaching Tower**, a structure which played an important part in the siege of medieval castles.

**Breach of Contract.** The failure to perform any material term of a contract, subjecting the defaulting party to an action for the damages sustained by the breach. In cases where the performance of a contract by one party is a condition of its performance by the other, a breach by the former relieves

the latter from his obligation. See **CONTRACT**, **SPECIFIC PERFORMANCE**.

**Breach of the Peace.** Any violation of public order. The reign of law and order is the King's peace, or, in the U. S., the peace of the people of the state. Any act by which that order is disturbed is a breach of the peace. In popular language, the term is generally confined to assaults, affrays, riots, and other acts of violence.

**Breach of Promise of Marriage.** The refusal of a man or woman to perform a contract of marriage. Such refusal is ground for an action for damages. See **MARRIAGE**.

**Bread.** Cereals have always been a staple food for the human race, and bread is the most satisfactory form in which they can be used, all things considered. Wheat, rye, corn (maize) and oats are most generally used for breadmaking, and less commonly, barley, buckwheat, rice, etc. Grain is usually prepared for breadmaking by cleaning, crushing, and bolting to obtain a fine, soft powder called flour or meal, which is made into dough with water or milk, or both, and baked. Salt is usually added to the dough, and frequently a little sugar and lard or butter. If no yeast or other leavening agent is mixed with the dough, unfermented bread results, and to make up for the lack of porous structure, unfermented bread is usually baked in flat, thin cakes. The passover bread of the Jews and hardtack or pilot bread are common forms of unleavened bread. In making fermented bread, sour dough or leaven and yeast are the common leavening agents.

The dough should be thoroughly kneaded so that the yeast will penetrate every part of the mass, and should then be allowed to stand in a warm place, for some warmth is an essential condition to the fermenting process. After a time the whole mass of the dough is honey-combed with bubbles of gas, and it is usually kneaded a second time to break up the larger bubbles into many small ones and distribute them evenly through the mass of the dough. The thoroughly kneaded mass is next moulded in loaves and is again allowed to rise. Aërated bread, which is popular in London, was invented by an English physician, Daughlish, in 1856, and is made without the use of yeast by incorporating carbon dioxide with the dough by means of a special machine.

In modern bakeries bread is made entirely by machinery and need not be handled at all by the hands until it is delivered to the customer. Wheat flour of all grades and breads

made from it, are among the cheapest, most digestible, and most nutritious of human foods, and well worthy of the high estimation in which they are generally held. Though furnishing a fair proportion of protein, breads are essentially carbohydrate foods, and so may very properly be combined with meat, milk, eggs, and other nitrogenous materials to form a well balanced ration.

**Bread-fruit.** The bread-fruit tree (*Artocarpus incisa*) is a native of the E. Indies and the islands of the Pacific, where its fruit constitutes an important article of food. The tree grows to a height of about 40 ft., and has bold, leathery leaves varying from a foot to half a yard in length. The male flowers



*Bread-fruit*: 1, Stamens; 2, pistil; 3, section of fruit.

are borne in catkins, the female appear as globular heads. The fruit is of the size and shape of a melon with knobbed rind. It is usually cooked in a hole in the ground; it is cut into several pieces, and the core is removed; after which it is placed on heated stones for half an hour, with leaves, in alternate layers.

**Bread Nut**, the fruit of *Brosimum alicatum*, of the Urticaceæ, common in the W. Indies, etc. The nuts taste like hazel nuts, and, roasted or boiled, are used as bread; the leaves and shoots are greedily eaten by cattle. The wood resembles mahogany.

**Bream** (*Abramis*), fish belonging to the carp family, distinguished by the compressed and elevated body, the short dorsal fin, and the absence of barbels on the mouth.

**Breast**, popularly used for the thorax or

chest, but here restricted to its anatomical sense—i.e. the milk gland or mamma of mammalia. Breasts exist in the male as well as in the female—in the former only in a rudimentary state, unless their growth has been excited by peculiar circumstances. In the female they are two hemispherical eminences in the pectoral region, corresponding to the intervals between the third and sixth or seventh ribs, and extending from the sternum to the axillæ. They are of small size before puberty, enlarge during pregnancy, and become atrophied in old age. The outer surface is convex, and has a small conical prominence, the nipple. The mamma consists of glandular lobes, of fibrous tissue connecting the lobes, and of fatty tissue in the intervals between them. The lobes are connected by areolar tissue with blood-vessels and ducts. The ducts unite to form larger ones, which terminate in excretory ducts opening into the nipple.

The breasts are the seat of tumors—some non-malignant, as cysts, adenoma, and fatty tumor; others malignant, as sarcoma or cancer.

**Breasted, James Henry** (1865-1935), American Egyptologist, historian and scholar, was born in Rockford, Ill. He was professor in Chicago University (1894-1933); professor of Egyptology and Oriental history, from 1905; was director of the Oriental Institute and its archaeological researches in the Near East. He published monographs, histories, textbooks; *History of Europe* (1920); *The Dawn of Conscience* (1933).

**Breath.** See LUNGS.

**Breccia**, a rock consisting of angular fragments united by a matrix. The shape of the components indicates that they have been produced by fracture, and have not been subjected to rounding, by attrition.

**Breckenridge, John** (1797-1841), American clergyman, was born near Lexington, Ky., and graduated (1818) at Princeton. He became a Presbyterian clergyman, and was chaplain of Congress, 1819-21. His controversy with Archbishop Hughes on the respective merits of the Roman Catholic and Presbyterian churches attracted much attention, and the papers were collected and published (1836).

**Breckenridge, Robert Jefferson** (1800-71), American clergyman and educator, brother of John (1797), was born near Lexington, Ky., and graduated (1819) at Union. He studied and practiced law for several years, but in 1829 joined the Presbyterian

Church, freed his slaves, and in 1832 was licensed to preach, becoming pastor of the 2nd Presbyterian Church at Baltimore, where he remained thirteen years. He had much to do with the establishment of the public school system in Kentucky.

**Breckinridge, John Cabell** (1821-75), American lawyer, political leader, and soldier, born near Lexington, Ky. He was a Democratic representative in Congress (1851-5) and was vice-president of the U. S. (1857-61). In 1860 at Baltimore he was nominated for the presidency by the seceders from the regular Democratic convention, representing only 21 states, and in the ensuing election stood next to Lincoln, receiving 72 electoral votes. He was immediately elected to the U. S. Senate, but withdrew and joined the Confederate army with the rank of major-general (commissioned Aug., 1861). From Jan. to April, 1865, he was Secretary of War in the cabinet of Pres. Davis, and on the collapse of the Confederacy fled to Europe.

**Brecknockshire**, or **Brecon**, an inland county of Wales, w. of Herefordshire. Area, 742 sq. m. The surface is very mountainous, and presents much picturesque scenery. The county forms part of the great S. Wales coal field. There are many remains of antiquarian interest, such as Roman stations, stone circles, and cromlechs. See T. Jones's *History of the county* (2 vols. 1805-9; repr. 1898); p. about 56,484.

**Breda**, tn., prov. N Brabant, Netherlands, 19 m. s.e. of Dordrecht. Here were signed the compromise of Breda in 1566, the declaration of Breda in 1660 by Charles II. of England, and the peace of Breda in 1667 between England and Holland; p. 84,496.

**Bredow**, a suburb of Stettin, Germany, with factories, iron works, and shipbuilding yards. The Atlantic liners *Deutschland* and *Kaiser Wilhelm der Grosse* were built here. It was absorbed in Stettin in 1900.

**Brée, Matthias Ignatius van** (1773-1839), Flemish painter. A painter of historical and allegorical subjects, he excelled in coloring. His brother Philip (1786-1871) was also a painter of some note.

**Breeders' Associations in America.** There are numerous associations of breeders of domestic animals in America. Those societies for breeders of cattle, swine, horses, and sheep being most important.

**Breeding**, a term particularly applied to man's control over the pairing of domesticated and semi-domesticated animals. The domestication of all the more important

components of what we may call 'stock' was effected in prehistoric times.

In general theory, by some form of isolation, man secures the inbreeding of similar variants until the characters he desires to foster have become more or less prepotent in inheritance, and a new breed is established.

It is not possible at present to formulate 'laws of breeding.' There are, however, some valuable results which will eventually be incorporated in a unified theory.

In 1865 Gregor J. Mendel formulated what is now called Mendel's law. Within our space we cannot do justice to Mendel's discovery, but the gist of it, in Bateson's words, is this: 'The germcells or gametes produced by cross-bred organisms may, in respect of given characters, be of the pure parental types, and consequently incapable of transmitting the opposite character; that when such pure similar gametes of opposite sexes are united together in fertilization, the individuals so formed and their posterity are free from all taint of the cross; that there may be, in short, perfect or almost perfect discontinuity between these germs in respect of one of each pair of opposite characters.'

Consult Rice, V. A., and Andrews, F. N., *The Breeding and Improvement of Farm Animals* (4th ed. 1951); Warren, D. C., *Practical Poultry Breeding* (1953); Winters, L. M., *Animal Breeding* (5th ed. 1954). See also BIOLOGY; HEREDITY; MENDEL'S LAW.

**Brehon Laws**, the name used to denote the jurisprudence of ancient Ireland.

**Breitenfeld**, village, Germany. It is noted as the place where, in 1631, Gustavus Adolphus of Sweden defeated the forces of the Catholic League of the empire, commanded by Tilly. See LEIPZIG.

**Breitkopf, Johann Gottlieb Emmanuel** (1719-94), son of Bernhard Christoph Breitkopf, invented movable music type, improved the shape of the German characters.

**Breitmann, Hans.** See **Leland, Charles Godfrey.**

**Bremen**, Amer. Zone, Germany. The duchy of Bremen was assigned in 1648 to Sweden, whence it was sold in 1715 to Hanover; p. about 568,335.

**Bremen**, seaport and airport, Germany, capital of the state of Bremen. Several bridges connect the old and new towns and fine promenades have been laid out on the old ramparts surrounding the old town. Many statues adorn the city, chief among which are those of Bismarck, William I.,

Frederick III., Moltke, and Bürger Park is an attractive spot laid out in English style. The North German Lloyd Steamship Company, whose chief port it is, lost most of its fleet by the Treaty of Versailles, but in 1922 regular sailings were resumed between Bremen and New York and by 1925 shipping had reached almost its pre-war level. Bremen was heavily bombed by air forces of the United Nations in World War II; p. 444,196.

**Bremer, Frederika** (1801-65), Swedish novelist. She received the Swedish Academy gold medal in 1844. Her works faithfully portray Swedish middle-class life.

**Bremerhaven**, seaport (outport of Bremen), Germany. The town dates from 1827, when Bremen bought land from Prussia, whereon she has since constructed three large harbor basins, besides docks (including the dry dock of the North German Lloyd), and wharves; p. 113,925.

**Brendan, or Brenainn, St.** (484-577), of Clonfert, called 'son of Finnloga' to distinguish him from St. Brendan of Birr, is the hero of the *Navigation of St. Brendan*, a popular tale of the Middle Ages. His day is May 16.

**Brendan, St.** (?490-573), of Birr, now Parsonstown, in King's co., Ireland. A disciple of St. Finnian of Clonard. His day is November 29.

**Brenner Pass**, a mountain pass which connects the valley of the Inn with that of the Etsch. It is the lowest (4,485 ft.) of the great Alpine passes.

**Brent, Charles Henry** (1862-1929), American Protestant Episcopal bishop; Bishop of the Philippines 1901-1918 and of Western New York, 1918-1929. In World War I he was chief of the Chaplain service of the A. E. F. in France, and is an officer in the Legion of Honor. His publications include *With God in the World* (1889), *Prisoners of Hope* (1915), *The Mount of Vision* (1918).

**Breshkovsky, Catherine** (1844-1934), called 'Little Grandmother of the Russian Revolution,' was of noble birth. She devoted herself early to the social welfare of the Russian peasant; visited the U. S. (1904-05); sentenced to 30 years' exile in Siberia; was released by the Bolsheviks, 1917.

**Brescia**, city, Italy, in Lombardy, capital of the province of Brescia; p. 113,489.

**Breslau**, town, capital of the province of Silesia, Poland. (Breslau is more popularly known now by its Polish name, Wroclaw.) This large city consists of the old and new towns and suburbs. Educational institutions

founded by the Emperor Leopold I.; p. 303, 312.

**Brest**, fortified seaport, department of Finistère, France. There are extensive shipyards. In 1499 it fell to the French by the marriage of Louis XII. with Anne of Brittany, and in 1512 an English fleet under Lord Howard made an unsuccessful attempt to reconquer it. The town was an important embarkation station for American troops during World War I; p. 67,861.

**Brest-Litovsk**, town and important fortress, Russian Poland. It was considered an impregnable stronghold up to its capture by the Germans during World War I. Ukrainian delegates signed a separate peace with the Central Powers at Brest-Litovsk on Feb. 9, 1918. The Supreme War Council of the Allies refused to recognize the treaties, and their renunciation was a condition of the armistice which ended the war.

**Brethren, Apostolic**, a North Italian sect of the 13th and 14th centuries, which urged a return to the primitive communism of the apostolic church. Its founder, Gerhard Segarelli, was burned at the stake (1300). The name was also applied to a sect in Asia Minor, which condemned marriage and followed Christian communism.

**Brethren, Bohemian**. See **Moravians**.

**Breton, André** (1896- ), French poet, essayist, novelist, theorist, editor, critic and founder of Surrealism, was born at Pinchebray. From 1917-1921 he was one of the leaders in Paris of the Dada movement, a philosophy of boredom with life. With the decay of the Dadaists, Breton led them in a new movement, Surrealism, in 1924. This cult attempts to explain the subconscious mind, inhibitions and dreams through painting and literature. He is author of two manifestos on Surrealism, the first published in 1924 and the second in 1930. He was editor of the Parisian paper, *La Revolution Surrealiste*, 1925-1930, and the magazine, *Le Surrealisme au Service de la Revolution*, 1930-1933. He published in 1928 *Le Surrealisme et la Peinture*, considered the greatest work on Surrealist painting.

**Breton, Cape**. See **Cape Breton Island**.

**Breton, Jules Adolphe Aimé Louis** (1827-1906), French painter, a master of the realist school of peasant-painters. His best pieces include *Blessing the Fields* (1857), *Song of the Lark* (1885). He was also an author of note. Consult his autobiographical *Vie d'un Artiste*.

**Breton Language and Literature**. Breton (Fr. *Bas Breton*), or Armorican, the ancient language of Brittany, is a Celtic dialect, forming, together with Welsh and the extinct Cornish dialect, the Cymric or southern group of the Celtic languages. The chief monuments of ancient Breton literature (after the 6th century) are two miracle plays of the 14th century—*Le Grand Mystère de Jésus* (ed. by La Villemarqué, 1866) and *Le Mystère de Saint Nonne*.

**Bretton Woods Conference**. See **UNITED STATES, UNITED NATIONS CONFERENCES**.

**Bretts and Scots, Laws of**, an old code of laws, of which only a fragment remains, evidently a survival of Cymric and Gaelic jurisprudence in Scotland. The 'Bretts' were the remnants of the old Britons. The most noteworthy feature of these laws is the institution of the *cro*, which was the price at which every man's life was valued and which had to be paid to his kindred as compensation in the event of his being murdered.

**Brueghel, Brueghel, or Breugel**, a family of Flemish painters. (1). **PIETER** (c. 1530-69). (2). **PIETER THE YOUNGER** (1564-1637), his son, 'Infernal,' because of his paintings of hags, witches, devils, and kindred subjects. (3.) **JAN** (1568-1625), the best of the three, was called the 'Velvet,' from the smoothness of his style. Consult Michel's *Les Brueghels*.

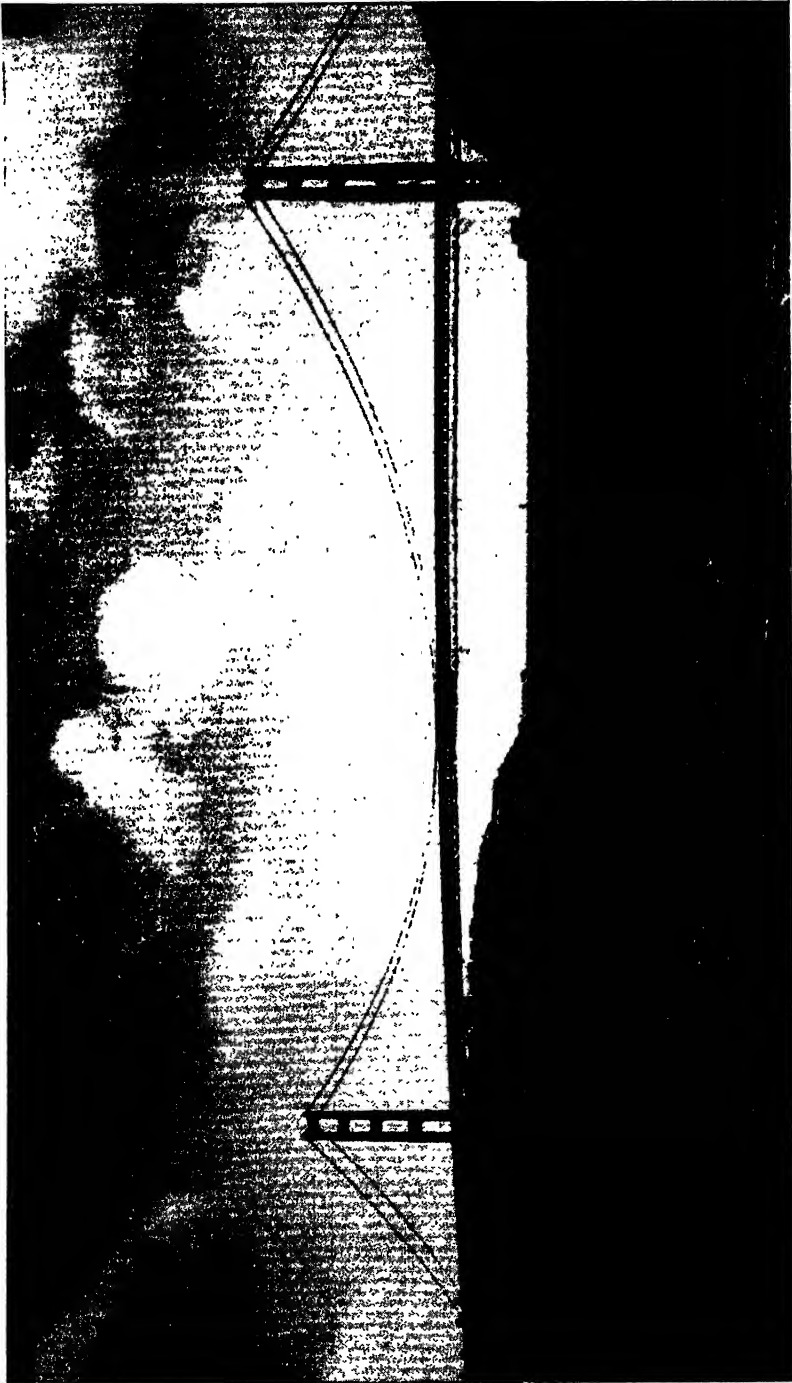
**Breve**, in musical notation a note having the value of two whole notes or semi-breves.

**Breve**, an old Scots law term signifying a short, compendious writ issued from the crown to a judge, ordering him to try by jury the points outlined in the writ.

**Brevet**, a military commission in the U. S. Army bestowed by the Senate, upon the nomination of the President, as a reward for gallant and meritorious service in the field.

**Breviary**, a book containing the divine office, which every Roman cleric in holy orders and choir, monks, and nuns are bound to recite daily. The breviary is divided into four parts—a winter, spring, summer, and autumn quarter.

**Brewing**, the process by which malted grain is treated with hot water to produce a wort. This is boiled with hops, filtered, and cooled, and is then made to undergo alcoholic fermentation. In the preparation of native beers, such as *bousa* (Abyssinian beer), samshoo, and others, spontaneous fermentation is allowed; but in civilized countries the greatest care is taken to prevent that process. Beer is a beverage of the most remote an-



© Wide World Photos

Golden Gate Bridge, at San Francisco.

tiquity. The Egyptian god Osiris is said to have taught mankind to make a drink from barley not much inferior to wine. The chief objects to be attained in malting are the modification or rendering naked of the starch cells; the development of the diastatic, proteolytic, and other enzymes present in the grain; and alterations of a physical nature by growth of the acrospire and rootlets.

Brewing operations embrace the production of the wort from the raw materials; they include all the operations from the cleaning of the malt up to the point where the yeast is added to the wort in the settling tank or fermenting vat. The selection of the methods to be employed to produce beer depends upon the quality and character of the finished product. The character or properties of a beer necessarily depend upon its composition, that is, the amount and nature of the various substances present in the beer.

Mashing is the process of extracting the goods by mashing them with water at suitable temperatures and in proper relative quantities preparatory to the boiling in the kettle. Chemically, it proceeds in the main by the inversion of the malt into maltose, malto-dextrin, and dextrin, and the modification of the insoluble albuminoids into a soluble form.

By the infusion method the mash is brought to its final temperature by the addition of water of a suitable high temperature; by the decoction method part of the mash itself is raised by boiling and then returned to the mash-tub. The American raw material method is a combination of both, as the raw grain is boiled separately and run into the malt mash to produce the final temperature. After the mashing process is completed and a wort of the proper composition is obtained the mash is allowed to rest for the purpose of permitting the grains to settle well, so as to form a good filtering material and allow the wort to run off quickly. As a rule, the mash is kept on rest for about one-half hour.

A good filtration of the wort depends upon the quality of the malt, the conversion, and the grinding of the malt; also upon the arrangement of the drawing pipes. Then sparging begins. The object of sparging is to wash out the extract from the grains. The wort obtained by mashing is boiled for the purpose of coagulation of the albuminoids, that is, break of the wort; evaporation of water, consequently concentration of the wort; extraction of hops. The hop cones

which are used in brewing contain between their leaves a yellowish hop-flour—the so-called lupuline—which contains the active principles of hops; namely, the aromatic oil and the resinous and bitter substances. The hops are added in different portions, in order to secure both the bitter and aroma. The quantity of hops depends upon the quality of the hops and the preference of the public for a more or less bitter beer. After the wort has been cooled to the proper temperature it is ready for pitching with yeast. The substance by the agency of which fermentation is carried on is called 'yeast.' The yeast, after fermentation is over, will settle to the bottom, and the fermented beer is stored for four to eight weeks—sometimes longer. The object of storing the beer is, to eliminate certain suspended matters like yeast, thereby securing greater clearness and greater durability.

As a rule, ale is hopped more strongly than lager beer. *Porter* is brewed and fermented in the same manner as ale. The main difference between lager and ale is in the methods of mashing, the character of the yeast, and the temperatures during fermentation. *Weiss beer* is a top-fermenting beer which is in a high state of strength after-fermentation, and which possesses much life and a prickly, somewhat sour taste. It is prepared from barley malt and wheat malt. See Thausing's *Theory and Practice of the Preparation of Malt and the Fabrication of Beer*.

**Brewster, Sir David** (1781-1868), Scottish natural philosopher. He commenced a series of papers contributed to the Royal Society on the *Polarization of Light*, for which he was awarded the Copley medal. In 1816 the Institute of France adjudged to him the half of the prize for physics, and in the same year he invented the kaleidoscope. Among his general works may be mentioned: *Martyrs to Science; Life of Newton*. Consult *The Home Life of Sir David Brewster*, by his daughter, Mrs. Gordon, which contains a complete list of his writings.

**Brewster, William** (c. 1560-1644), one of the *Mayflower* pilgrims. Strongly influenced by the Puritan doctrines of the times, he withdrew from the English Established Church, and formed a society which met for worship at his house. Persecution, however, drove the members to seek a refuge in Holland. He sailed with the *Mayflower* in 1620, and acted as pastor to the church at Plymouth. Consult Steele's *Life and Times of William Brewster*.



**Brian** (926-1014), famous king of Ireland, known as Brian Boromhe, or 'Brian of the tribute,' defeated the Danes at Sulcoit, near Tipperary (968). He then made a triumphal circuit of Ireland, receiving hostages from all the tribes. Thus he became *Ard-Righ na Erenn*, chief king of Ireland, and such he remained until his death.

**Brian, Donald**, actor, born at St. John's, Newfoundland. He starred in the revival of *The Merry Widow* and *Private Lives*, 1930-31.

**Briançon**, ancient *Brigantium*, capital department of Hautes-Alpes. It is a fortress of the first class, and the most elevated town (alt. 4,330 ft.) in France; p. about 6,671.

**Briand, Aristide** (1862-1932), French statesman. He studied law, became interested in politics, and became a recognized leader of the Socialist party. In 1902 he was elected a member of the Chamber of Deputies. In 1906 he was made Minister of Public Instruction and Worship, and was thereupon read out of the Socialist party. He succeeded Clémenceau as Prime Minister in 1909. He resigned in 1911; was again Premier for a short period in 1913, forming the first Cabinet under President Poincaré; and in October, 1915, during the European War, accepted the Premiership for the third time. He was returned as Premier in 1921, as Minister of Foreign Affairs in 1925, as Premier late in the same year, and as Minister of Foreign Affairs in 1926. In 1925 he had an important part in the Locarno Agreements. For his work in helping restore peaceful relations following World War I he was awarded the Nobel Peace Prize. In 1927 he was actively associated with Mr. Kellogg in formulating the Kellogg Pact, which was ratified by the various nations in the following year. He became a leading figure in the assemblies of the League of Nations. Briand's project of a "United States of Europe" to supplement the League of Nations never was realized. He died of a heart attack at his Paris home in 1932 and was buried in a simple peasant grave in his native Normandy. Mme. Jeanne Noutreau, with whom he lived for many years, died two years later and was buried beside him.

**Briareus**, or *Ægeon*, son of Uranus and Gæa, a giant who helped Zeus conquer the Titans.

**Briar Root**, a fine hard wood obtained from the roots and knots of the tree heath *Erica arborea*. Largely used for tobacco pipes.

**Bribery** consists in making the offer of any gift or reward to one holding a public office

or enjoying a public right, for the purpose of influencing his official conduct.

**Brice, Fanny** (1892-1951), Am. comedienne. Characterized as "Baby Snooks."

**Brick**, a moulded block, usually of burned clay, extensively employed in building. The use of brick dates from very ancient times, the earliest examples probably being the sun-dried specimens of Egypt, Assyria, and Babylonia, subsequently introduced by the Moors into Spain, and by the Spaniards into Spanish America (see ADOBE). Kiln-baked brick is also found in the chief ruins of ancient Babylonia. Most of the great Roman ruins are of brick, and the Romans seem to have introduced the art of brick making into England. All ancient bricks, whether baked by the sun or by fire, were of clay mixed with grass or straw. The clay from which common *building brick* is made consists essentially of hydrated silicate of alumina. The earth, after being excavated, usually undergoes a process of weathering, which lasts for a period varying from a few days to a couple of months. In the older processes the clay is then moistened and mixed to a plastic state, either in the pit or in a primitive pug mill, and pressed into the moulds by hand. In more modern plants both tempering and moulding are done by machines. The green bricks, after being carefully dried in the sun or by artificial heat, are usually baked in kilns with a suitable arrangement of fires and flues. Bricks vary in size, shape, color, and texture. The color depends largely on the amount of iron present in the clay. Bricks are also classified according to their method of manufacture, material, and uses.

Fire brick, which is especially adapted to resist very high temperatures, consists of almost pure clay. These bricks are used chiefly for lining stoves and furnaces. Sandlime brick is made of sand or crushed sandstone cemented together with silicate of lime. It is mixed and moulded much like dry-clay brick, and is hardened under steam pressure. In cement-sand brick, Portland or other cement is used as the binding material. Vitrified brick, sometimes known as clinkers, is prepared by burning the clay to the point of vitrification, and annealing or toughening by slow cooling. It is used chiefly for paving and in engineering construction. Glazed bricks have the surface covered with a special glaze. They are highly useful not only for decorative purposes, but for passages, stables, and other places which require frequent cleaning.

Slate bricks are made from the debris of slate quarries, and are among the strongest bricks known. See BRICKLAYING; POTTERY.

**Bricklaying** is the art of arranging bricks, and embedding them in a mortar of lime or cement in such a way that they will form a structure of a given shape and the necessary degree of stability. A layer or stratum of bricks is known as a *course*, and the arrangement of the bricks in successive courses as the *bond*. Bricks laid with their lengths in the direction of the course, and their sides to the wall face, are called *stretchers*; those laid transversely, with their ends forming the wall face, *headers*; a layer of headers, a *heading course*; of stretchers, a *stretching course*. Three bonds are commonly used in building construction: *English bond*, consisting of alternate courses of headers and stretchers; *Flemish bond*, of alternate headers and stretchers in the same course; and *common bond*, of from four to seven courses of stretchers to one of headers. The process of bricklaying is best illustrated in wall construction. Walls usually consist of two exterior courses, with one or more interior or filling courses between them. The outside courses are first laid. The mortar is spread with a trowel along a bed for the brick, and a dab of mortar is scraped against the outer vertical angle of the last brick laid. Then the brick, which should be damp or wet, is pressed into place with a sliding motion, so that the mortar is forced into the pores of the brick and absolute adhesion is guaranteed. When the outer courses have been laid to an angle or opening, the space between them is filled with a thick bed of soft mortar, and bricks are pressed into this mortar in a downward diagonal manner. This is technically known as 'shoving,' and the courses are raking courses or herring-bone work, according as the bond is common, English, or Flemish.

**Bridewell**, parish, city of London, England; once contained a famous prison.

**Bridge**, or **Bridge Whist**, a game of cards, possibly of Russian origin. It was played in the clubs of Constantinople and Egypt about 1865, and before the 19th century had found its way to the Riviera, Paris, Great Britain, and the United States. Bridge is a game for four persons, two being partners against the other two. Only three persons actually engage in playing the cards, for the dealer's partner exposes his hand on the table and it is played by the dealer in partnership with his own. The game then re-

olves itself into one of dummy whist (see WHIST).

Auction Bridge, which superseded simple ridge, differs most particularly in that the declaration of trumps goes to the player who bids the highest number of tricks for the privilege. If the Declarer is successful in making his bid, he scores all the trick points (see above) he makes. If the Declarer fulfills a doubled contract, he scores the doubled value of his odd tricks and for fulfilling his contract an additional 50 points in his honor score. If he makes more than his contract he scores an additional 50 points for each extra trick. If he is unsuccessful, his adversaries add 50 points to their honor score for each trick he falls short of his bid, regardless of the suit. For winning the rubber, 250 points are added to honors.

#### *The Score in Auction Bridge Odd Trick Values*

In No-Trump .....	10	points
In Spade Trump .....	9	"
In Heart Trump .....	8	"
In Diamond Trump .....	7	"
In Club Trump .....	6	"

#### *Honor Values*

3 in one hand	0 in other	30	points
2 " " "	1 " "	30	"
3 " " "	1 " "	40	"
2 " " "	2 " "	40	"
3 " " "	2 " "	50	"
4 " " "	0 " "	80	"
4 " " "	1 " "	90	"
4 " " "	No-Trump	100	"
5 " " "	0 in other	100	"

The value of honors are not changed by doubling or redoubling. Grand slam counts 100, little slam 50 in the honor score.

Contract Bridge is a development of *Plafond* (a game popular in France and parts of Belgium), in which the suits rank for scoring purposes as in Auction. The main points of difference between Contract and Auction Bridge are that in the former the player scores below the line only such tricks as he contracts to take, and a side is *vulnerable* after winning a game. Should any excess tricks be taken they are credited in the honor score as a bonus. In drawing for partners and choice of seats precedence is given to the drawers of the higher cards, the Ace ranking highest. A card once touched in Dummy, except for the purpose of arrangement, must be played. If the Declarer leads from the wrong

# CONTRACT BRIDGE SCORING TABLE (New International Code—Effective March 31, 1935)

## **Each Trick Over Six**

Clubs or Diamonds, 20; Spades or Hearts, 30

No Trumps: First trick 40, each succeeding trick 30.

(If doubled, multiply by 2; redoubled, by 4.)

## **Overtricks:**

	Not Vulnerable	Vulnerable
Undoubled, each . . . . .	Trick Value	Trick Value
Doubled, each . . . . .	100	200
Redoubled, each . . . . .	200	400

## **Slams:**

Little Slam . . . . .	500	750
Grand Slam . . . . .	1000	1500

## **Honors:**

if held in one hand { Four honors 100, Five honors 150  
Four Aces, at no trump . . 150

	Not Vulnerable		Vulnerable	
Penalties:	Undoubled	Doubled	Undoubled	Doubled
1 Down . . . . .	50	100	100	200
2 Down . . . . .	100	300	200	500
3 Down . . . . .	150	500	300	800
4 Down . . . . .	200	700	400	1100
5 Down . . . . .	250	900	500	1400
6 Down . . . . .	300	1100	600	1700
7 Down . . . . .	350	1300	700	2000

*If redoubled, multiply the doubled values by 2.*

**Game:** 100 points below the line constitutes a game. Only the tricks bid and made count toward game. All tricks made over contract count as overtricks.

**Rubber Premium:** If made in 2 games, 700; if made in 3 games, 500.

If unfinished, winner of one game, 300.

**Revoke:** 2 tricks for the first revoke, 1 trick for each subsequent revoke. No tricks made before revoke occurs can be claimed for penalties. No penalty for revoke made on 12th trick.

hand, and attention is called to the fact by an adversary, he must lead a card of the same suit from the right hand. If Declarer plays from Dummy prematurely, fourth hand has the right to play before the second. When the Declarer claims all the remaining tricks he is obliged to state definitely how he intends to play the hands, including any finesse; the opponents may call on him to amplify it or to play the hand as directed. For further rules and instruction consult Culbertson, J. M., *Contract Bridge for Beginners* (1943) and *Contract Bridge for Everyone* (1948); Goren, C. H., *Contract Bridge Complete* (1951) and *Contract Bridge Made Easy* (rev. ed. 1953); Culbertson, Ely, *Culbertson's New and Complete Summary of Contract Bridge* (1953) and *Contract Bridge Complete* (1954).

**Bridge of Sighs** (Italian *Ponte dei Sospiri*), a covered stone bridge in Venice, crossing the Rio della Paglia and connecting the Doge's Palace with the criminal prisons. The name was also given to a bridge in New York City, joining the Criminal Courts Building and the Tombs Prison. Thomas Hood's poem

*The Bridge of Sighs* refers to neither of these bridges, but was inspired by the drowning of a London outcast in the Thames.

**Bridgeport**, city, Connecticut, one of the county seats of Fairfield County, on Long Island Sound. The estuary of the Pequonnock River, which empties into the Sound at this point, and Yellow Mill Creek, a tidal inlet, furnish excellent harbor facilities. Bridgeport is an important manufacturing centre. Important products are corsets, sewing machines, typewriters, brass, iron, and steel tubing, arms and munitions, torpedo boats, tools, machinery, and hardware. The city also has shipyards and a thriving oyster industry. A centre for the manufacture of war munitions during the World Wars; p. 158,709.

**Bridger's Pass**, a defile of the Rocky Mountains, in southwestern Wyoming.

**Bridges** are the chief of the three available means of crossing rivers: ford, ferry, and bridge. Many different types of bridges are used, according to the conditions to be met at the crossing. The log and vine used by our aboriginal ancestors were early superseded by man-made beam and (probably in China)

suspension bridges. Arches, invented by the Etruscans, were perfected and applied by the Romans on a large scale to bridging; the elevated portions of their great aqueducts are monuments to their skill as arch builders (see ARCH). Beyond this stage, however, bridge

the pontoon bridge, and the bascule—the last named perhaps the leading form of the modern movable bridge. The most important of all present-day types, however, the truss bridge, is wholly new, and its development has extensively influenced that of the other



*Metropolis 720-Foot Span, the Longest Simple Truss Ever Built.*

A railway crossing over the Ohio River near Paducah, Ky. It also has four spans of 550 ft.

construction ceased to develop until within the last 150 years, and thus it may be said to have remained primitive until the modern era. The growth of the railway after 1820, calling for many and strong bridges, acted as a powerful stimulus. The roadway platform or floor of the modern bridge is not essentially different from that employed by the ancients,

types. The truss was first applied to replace the beam, and this is still its most important service. It is a meshwork of relatively slender bars, usually (considering now only the plane truss) arranged as a chain of triangles. Bridge construction has at all times been determined by the materials available. The ancients built bridges of wood, stone, and brick. Perma-



*Ewing Galloway, N. Y.*

*Birth of Forth Bridge, Scotland; 1,700 Foot Cantilever Spans.*

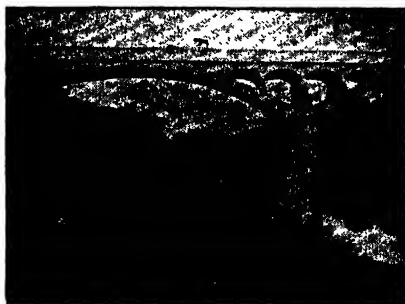
though transformed and improved as to materials, strength, permanence, etc. The characteristic developments have been in the carrying structure, and bridges are classified according to the nature of this structure. A number of the types, however, are identical with those of primitive times: the beam bridge, the arch bridge, the suspension bridge,

nent bridges were formed by a series of arches, which probably seldom exceeded 30 to 50 ft. span; these had to have masonry piers as supports. Large and deep rivers were often crossed by bridges of boats, or pontoon bridges (Darius, Xerxes), consisting of a number of boats fastened together to form a string from bank to bank, and beams with

floor planking laid over the boats to form a roadway. The mediæval bridges included as a new type the drawbridge, used to permit or bar access to fortified places and castles surrounded by a moat. Development began late in the 18th century with the construction of compound wooden beams (toothed beams) to make large bridge timbers out of small ones, and the devising of primitive wooden trusses in Switzerland and Germany. Then, the iron industry having progressed considerably, cast iron was utilized as material for arch bridges in a few instances. By that time the evolution of wrought-iron production and rolling began to make plates and shapes of iron available, and in the 3d decade of the 19th century some small beam bridges of wrought iron were constructed for railway use. But combination truss bridges, with timber struts and iron tension rods, developed in the thirties and forties; and in the latter part of that period iron rolled beams and plate girders came into some use for short spans, and truss bridges with cast iron struts and wrought-iron tie-rods for longer spans. About 1850 the first trusses built wholly of wrought iron appeared, and from that time onward there has been steady progress in wrought-iron bridge construction, as to both trusses and plate girders. Tubular plate girders quickly became obsolete. Suspension bridges saw great development for very long spans, reaching their climax for boldness in the erection of the Brooklyn Bridge at New York in the seventies and early eighties. Wrought iron was largely replaced by structural steel with 55,000 to 65,000 lbs. per sq. in. about 1895. Alloy steels such as nickel and silicon steels have been in use since 1900, and for the Kill van Kull bridge (1930), manganese steel was used for columns. Wood continues in use to a slight extent. Concrete and reinforced concrete is now used extensively for girders and for both monolithic and reinforced concrete arches, up to about 600 foot spans.

Stone arches continued in extensive favor long after the popularization of Portland cement, invented early in the 19th century. About 1890, however, cement concrete began to be used for arches, and soon afterward the development of reinforced concrete (concrete with embedded steel rods to give tensile strength in the required directions) led to the present-day extensive use of this material in beam and arch construction. Concrete arches are widely used for city bridges and on important country roads, but frequently also for railways. The longest span of modern Truss

Bridges is at present the *Metropolis* 720-ft. span. Cantilever Bridges are erected without falsework, by overhanging from the piers, pieces being added successively at the forward end to closure at the middle. Steel arch bridges of long span over wide and deep spaces present the boldest examples of modern steel bridge construction because of the



*Vaughn Bridge, on Manila South Road, P. I.*

balancing and fitting of great masses of steel in erection without falseworks before the arches are closed and self-supporting. The first structure erected in this way was the steel arch bridge over the Mississippi River at St. Louis in 1874. The Hell Gate arch of 1,000 ft., over the East River at New York City, has the distinction, besides being a part of the longest railroad bridge, of being designed for the heaviest live load of any bridge—it represents 4 trains of locomotives on 4 railroad tracks, laid in stone ballast throughout, with capacity and room for a 5-lane speedway boulevard on a second deck when desired for roadway traffic.

In the Suspension Bridge, the pull of the cables produces the action on the anchorage the opposite of the thrust of the arch, which is provided for in some cases by tying the cables back to the rock, and in some by the stability of a huge masonry anchorage block (*Brooklyn Bridge* and *Williamsburg Bridge* in New York City). Because steel wire can be made enormously strong (over 200,000 lbs. per sq. in. tensile strength), very long suspension spans are possible. The great George Washington Bridge over the Hudson River, from New York City to Fort Lee, N. J., has a 3,500-ft. span. Two other notable suspension bridges for roadway traffic have been built, one from Philadelphia, Pa., to Camden, N. J. (1,750 ft.), and the other over the Detroit River at Detroit, Mich. (1,850 ft.). Where a very wide river is so deep or has un-

favorable bottom for erecting falsework, the suspension bridge type is the most suitable and economical for a bridge of long span. The various types of bridges are used to suit span lengths and locations. Girder and truss bridges for short spans and comparatively long ones up to 700 ft. The analysis and safe design of bridges call for special and rather intricate methods of calculation. Every part of a bridge must be made of sufficient strength for the stresses which may be produced in it by any loads that can come on the bridge, in any possible positions of those loads. So also must the connections by which this part is attached to other members of the bridge be proportioned to their maximum service. The construction of any bridge must therefore be preceded by complete design of the structure in all its details, and the first step in the designing, after the bridge engineer has selected or laid out the general type and arrangement of parts, and determined what loads it will have to carry, is the calculation of the stresses. The invention of the I-beam about the year 1840 was an ideal step for the use of iron, and later of steel, for short beams and girders, and they may now be obtained from 3 in. deep up to 36 in. deep. The metal is largely concentrated in the top and bottom, or *flanges*, and connected by the *web*, or vertical portion, of moderate thickness. The flanges resist the tension and compression stress due to bending, while the web transmits these stresses, through the action of *shearing* stresses, both horizontal and vertical. The plate girder extends the I-beam principle to much larger dimensions. A number of separate slender pieces pinned together at their ends to form a meshwork of triangles, constitute a rigid assemblage resisting distortion (provided it is so stayed that it cannot be forced out of its plane). Such a meshwork is called an *articulated frame*, or more simply a *truss*. It has the property of the beam—namely, resistance to bending. The *lattice truss*, invented in the United States about 1804, was one of the earliest forms used for wooden bridges. A beam resting on ordinary supports at its ends, so that under vertical loads it puts only vertical pressures on the supports, is a *simple beam*, and a truss bridge similarly supported is a *simple span*, by far the commonest type. When one end of the beam projects beyond the support, the extension is a *cantilever*, which when loaded bends so as to be convex upward. When the cantilever ends of two beam spans are brought near together, another beam may be hung with its two ends to

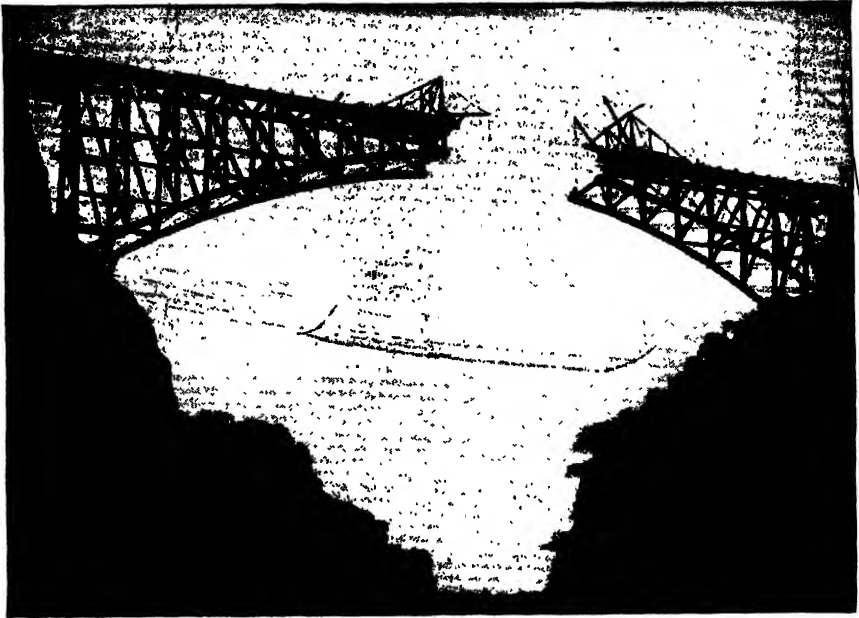
the ends of the cantilevers, and this arrangement constitutes a *cantilever bridge*. The intermediate beam hung from the cantilever ends is the *suspended span*. Various arrangements of beams with cantilever projections, with or without suspended spans, can be made, without affecting the type classification or the nature of the structure's action. Nearly all cantilever bridges have a suspended span, but a very prominent exception is the great *Blackwell's Island* or *Queensboro Bridge* across the East River at New York. The prodigious cantilever bridges across the Firth of Forth in Scotland (1,700 ft. span); the St. Lawrence at Quebec, Canada (1,800 ft.); and the Queensboro, represent sizes that the simple truss shows no promise of being able to reach. One factor in the superiority of the cantilever is its concentration of the heaviest members near the supports, whereas the simple truss has its heaviest members at the middle, where they require the largest amount of material to carry their weight. But probably the main factor is the possibility of free cantilever erection, without falsework supports, a process that is only in rare cases practicable with the simple truss, and then only at the cost of serious sacrifice of strength. Arches in modern bridge practice are of several types, the most complex of which is that represented by the classical stone arch, the *fixed-end* type.

Suspension bridges consist of a pair of chains or cables draped over towers and anchored at the extreme end, supporting a roadway platform by hanger rods or ropes. Small suspension bridges are built with stranded steel cable. The earliest suspension bridges of long spans were built in England and on the European Continent, with chains of eyebars, that is bars or plates connected with pins. Because stiffening-truss members can be attached to these pins, the eyebar-chain construction was at first contemplated for the *Manhattan Suspension Bridge* in New York (1,470 ft.). Wire cables were finally adopted, however. This bridge with two others nearby constitutes the most remarkable series of suspension bridges in existence. The earliest, the *Brooklyn Bridge* spans 1,595½ ft. and has stone towers. The *Williamsburg Bridge* (1,600 ft.) has steel towers of open trussing; while the Manhattan Bridge towers are of solid steel-plate tubular makeup. All have parallel-wire cables, made by drawing thousands of single wires across the span from tower to tower, pulling them up to exactly equal tensions, tying them together, and casing the whole in a weatherproof jacket. In the last

built of the three, for example, there are four cables  $20\frac{3}{4}$  inches in diameter; each contains 9,472 wires of about  $\frac{3}{16}$ -in. diameter. The specific strength of the wire is slightly over 200,000 lbs. per sq. in.; one entire cable has a breaking strength of about 28,000 tons. The *Golden Gate Bridge* at San Francisco has a span of 4,200 feet.

**Movable Bridges.**—When a river must be kept open for vessels, bridges over it must either be high enough to pass the highest

at either end and it is kept at a raised position and lowered only for passing trains. In the wide range of conditions presented to the bridge engineer, miscellaneous bridge types are occasionally required. The *pontoon bridge* is one of these; only a few are in existence, the most modern being the *Golden Horn Bridge* in Constantinople, built by German engineers. The *ferry bridge*, of which six or seven have been built, comprises a fixed bridge high enough above the river to clear



*The 500-Foot Zambesi Arch in South-Central Africa.*

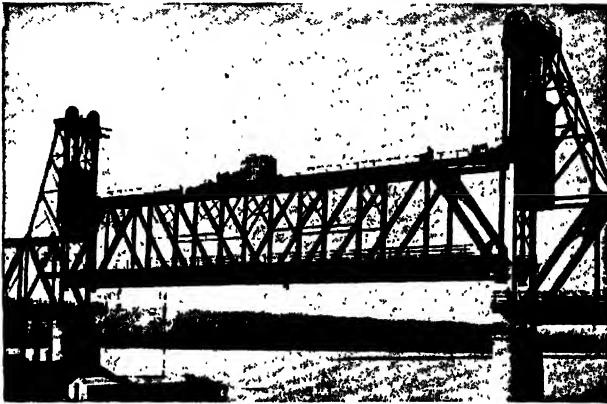
masts or smokestacks (125 to 160 ft.), or must be movable bridges that can be swung aside or up to clear the channel. For such service the swing bridge was exclusively used in former years. It consists of a plate-girder or truss bridge mounted on a single support that can turn on a pivot or circular roller turn-table. Railway swing bridges have been built to lengths of over 500 ft. (giving two channel openings of about 240 ft. each), but bascule and vertical-lift bridges, whose nature is illustrated in the accompanying figures were introduced after 1880, and came into wide use. The railroad bridge over the Cape Cod Canal is a vertical lift bridge with a movable span 544 ft. long, the longest span of this type in the world. The vertical span can be run up and down on two towers

all vessels, and a truck or car running along this truss, carrying by hangers a platform not far above river level, at the height of the banks. This arrangement serves precisely like a ferry, but is not dependent on water conditions. In some of these structures (in France) the bridge is of suspension type, in others (Duluth, Minn.) of rigid truss type. The latest, at Bordeaux, spans 1,312 feet.

Bridge Details are all carefully calculated, and are connected, as are all the plates and shapes forming each member, by punching or drilling holes which are filled by rivets driven hot or cold under great pressure from compressed air riveters. In recent years many of the parts and details are electrically welded together, and in a short time as experience is gained, such methods will practically

supplant riveting, at great saving in time and cost. Public supervision of the bridge construction is now under direction of government bridge departments, thus providing for safety for the public. Railway bridges are under control of the bridge engineering forces of the railway itself. The corrosion of steel

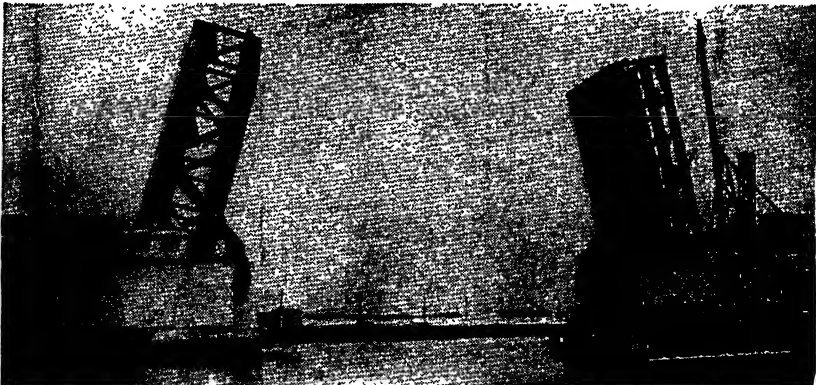
cost of from a few millions up to practically one hundred millions of dollars. America is still in the lead with the longest span for every type of steel bridge, the simple span of 720 ft. for the Metropolis bridge; the two 775 ft. spans of the Sciotoville bridge, by Lindenthal; the Cape Cod Canal railroad



*Vertical Lift Bridge Over the Arkansas River.*

bridges is provided against by frequent painting. Artistic treatment of bridges has in the past been very haphazard, but of recent years it has received attention all over the world, and now instead of being simply utilitarian structures, they are usually fundamentally beautiful. Cass Gilbert (1859-1934) was the

bridge (1935) with a movable span 544 ft. long; the 1,800 ft. span of the Quebec Cantilever in Canada; the 1,675 ft. arch and the 3,500 ft. suspension span, both at New York City, by Ammann. The great arch bridge constructed at Sydney, Australia, has a span of 1,650 ft. The cost of the bridge was in



*Bascule Lift Bridge Spanning the Flushing River, Between Flushing and N. Y. City*

authority on the Hudson River Bridge.

Long Span Bridges have developed rapidly in recent years, due to better and greater strength of steel from which to build them, and proper methods of financing the great

excess of \$25,000,000, and was fabricated in a plant erected near the site, from plates and shapes shipped from England. The span of this arch is only slightly exceeded by the new Kill van Kull bridge at New York City.



which has a span of 1,675 ft. between centers of the bearings on the piers; it was designed by Ammann, and is a three-hinged braced arch, with the bottom chord continuous from hinge to hinge. The total weight of steel used was 17,000 tons, and the total cost of the bridge was \$16,000,000, including all engineering charges and cost of financing.

The greatest suspension bridge in the world of 3,500 ft. span, also by Ammann, is over the Hudson river at 178th Street, New York City. It is called the George Washington bridge (see illustration on page 622). There are two steel wire cables, 36 inches in diameter, with 18,666 wires each, of a steel which has a breaking strength of 220,000 lbs. per sq. inch, and an elastic limit as high as 175,000 lbs. per sq. inch. The roadway, which is hung from the cables by special wire ropes, has a width of 110 ft., which provides for 8 lanes of traffic, and the addition in the future of rapid transit tracks. The steel towers are of latticed design 650 ft. in height, and while it was planned to encase them in stone, they have been left open, and with the graceful arched portals high above the roadway and the lacy effect of the latticing, they are very satisfactory from an architectural standpoint, so that the whole structure is an example of the great beauty of simplicity in design. Both the New Jersey approach drives which are practically on level ground, and those on the New York shore are very complicated in layout to care for the heavy automobile traffic.

The San Francisco-Oakland Bay bridge, opened November, 1936, has a total length of 8½ miles, of which 4½ miles crosses the navigable part of San Francisco Bay, the longest stretch of the kind in the world. Across the West Bay, from San Francisco to Yerba Buena Island, the bridge is 10,450 feet long, and includes two suspension spans of 2,310 feet each. The East Bay section has a cantilever span 1,400 feet in length, which is not only the heaviest in the world but third in point of size. These two sections are connected at Yerba Buena Island by a double-decked tunnel 540 feet in length, 76 feet in width, and 58 feet high. This is the largest vehicular bore tunnel ever built. The bridge is double-decked, having six lanes for automobiles on the upper deck, with space for two electric railway tracks and three lanes for motor trucks on the lower. The cost of the bridge was \$77,200,000, and the time required to build it was nearly three and one-half

years. It is estimated that its cost will be liquidated by toll charges in from 18 to 20 years.

The New York Triborough bridge connects the boroughs of Manhattan, Bronx and Queens, and the structure has a total length of 3½ miles. It is made of a suspension bridge with a channel span of 1,380 feet and side spans of 705 feet over the East River at Hell Gate; a vertical lift bridge over the Harlem River having a lift span of 310 feet; fixed truss spans over the Bronx Kills having a channel span of 350 feet; a plate girder viaduct structure in Queens Borough, on Wards Island and on Randalls Island, across Little Hell Gate and in the borough of Manhattan. There is also concrete viaduct construction at points in the three boroughs and at the junction on Randalls Island. The total cost was \$60,300,000.

The suspension bridge with the longest channel span in the world is the Golden Gate bridge at the entrance to San Francisco Bay. Its length is 8,940 feet, and between the towers (742 feet high) the span is 4,200 feet. The bridge was opened in 1937, and its cost was \$32,000,000.

**Bridges, Harry** (1901- ), American labor leader, born in Melbourne, Australia. Came to U. S. (1920) and naturalized (1945). Maritime labor leader on West Coast.

**Bridges, Robert** (1858-1941), American editor and author, was born in Shippensburg, Pa. He was assistant news editor of the New York *Evening Post* (1881-7), and editor 1914-30, then literary adviser of *Scribner's Magazine* (1914-30).

**Bridges, Robert Seymour** (1844-1930), English poet and critic, was born at Walmer, Kent, and educated at Oxford. He became poet laureate in 1913, and is best known for his *The Spirit of Man* (1916) and *The Spirit of Beauty* (1929).

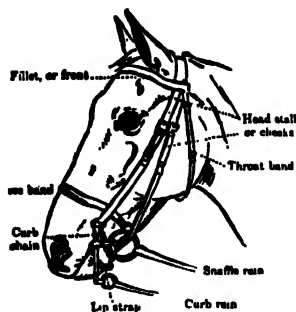
**Bridges, Styles** (1898- ), American public official, born W. Pembroke, Me. Gov. of N. H. (1935-37); U. S. senator (1937- ).

**Bridget, St.** (1302-73), was born near Upsala, Sweden. She was canonized in 1391. Her day is October 8.

**Bridgman, Laura Dewey** (1829-89), a native of Hanover, N. H. At the age of two, she lost sight, hearing, smell, speech, and (partly) taste. Under the tuition of Dr. Howe of Boston, she acquired the power of reading and speaking with her fingers; and subsequently she learned geography, history, algebra, and acquired proficiency in needle-

work and household duties. An analogous case is that of Helen Keller. See *Life and Education of Laura Drwey Bridgman*, by Miss Lampson (1878).

**Bridgman, Percy Williams** (1882- ), American physicist, born in Cambridge, Mass.,



Parts of Bridle.

and educated at Harvard. Taught physics and mathematics at Harvard (1910- ); won Nobel Prize (1946).

**Bridle**, the head harness of a horse or other beast of burden. Bridle bits are of three kinds—snaffles, curb bits, and stiff bits. The snaffle has two bars, jointed together in the middle, with rings at the end for the reins, with cheek-pieces to prevent the ring pulling into the horse's mouth. The curb bit comprises cheek-pieces or branches with eyes for the cheek-straps and the reins, and holes for the curb-chain; a mouth-piece, uniting the cheek-pieces and forming the bit proper, sometimes a bar uniting the lower ends of the branches; and a curb-chain. The elastic bit is a chain, often covered with soft rubber.

**Brief**. In the judicial procedure of the United States, the abstract or outline of his argument which a lawyer submits to the court on appeal, contains a brief statement of the judicial history of the case and of the facts elicited at the trial, the legal 'points' to be argued and supported, with a citation of authorities.

Briefs are submitted to all War Labor Boards, National Relations Boards and other agencies because such bureaus are issuing semi-judicial decisions under emergency powers delegated by Congress to the President of the United States for the duration of the present war. Such briefs are not only submitted in appeal cases but to expedite hearings on cases certified to the various bureaus.

**Brief, Papal**, a state document from the

Pope to an individual or to a religious community, giving advice or exhortation.

**Brieg**, or **Brzeg**, city in Wroclaw dept., Poland. In Silesia, Germany, until assigned to Poland by Potsdam Conference (1945); p. 31,419.

**Brienne, John of** (1148-1237), king of Jerusalem (1210-25) and emperor of Constantinople (1228-37). Led part of Fifth Crusade (1218-21) against Egypt.

**Brienx**, a considerable village in the Swiss canton of Bern, and the centre of the wood-carving industry. Brienx is built at the n.e. extremity of Lake Brienx; p. 2,580.

**Brierley, Benjamin** (1825-96), writer and poet in the Lancashire dialect, was born at Failsworth, near Manchester, England. In 1869 he started the publication of *Ben Brierley's Journal*, first a monthly and then a weekly magazine, and edited it until 1891.

**Brieux, Eugène** (1858-1932), Fr. dramatic author, b. Paris, wrote his first play, *Bernard Palissy*, in 1880, but only became known in 1890, when his *Ménages d'Artistes* was presented at the Théâtre Libre in Paris. Among his latest are *Les Américains chez nous* (1920), *Puisque je t'aime* (1929).

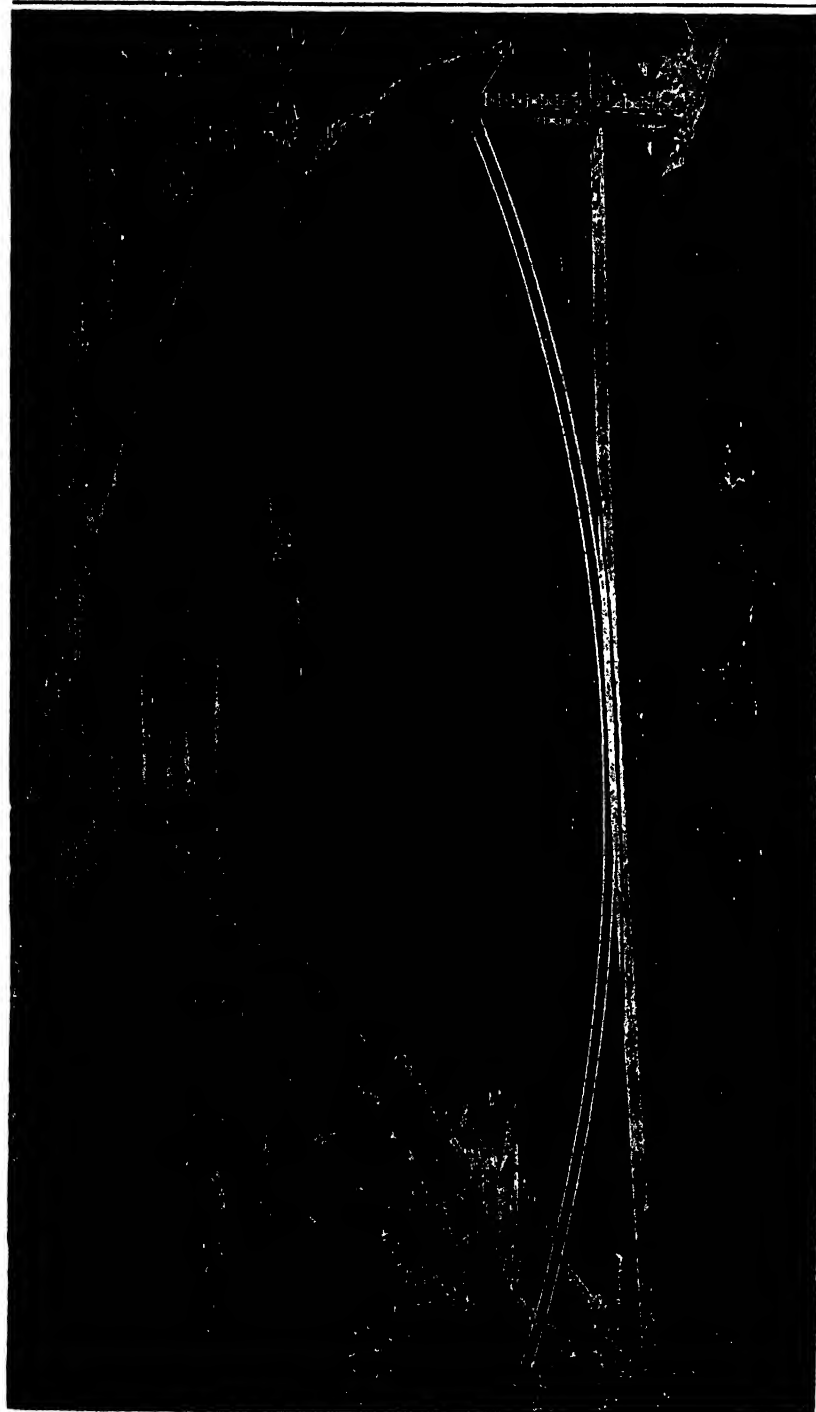
**Briffault, Robert Stephen** (1876-1950), English anthropologist, born in London. Served in World War I. Author of *The Mothers* (1927); *Europa* (1935); *Reasons for Anger* (1936); *Europa in Limbo* (1937); *Fandango* (1940); *New Life of Mr. Martin* (1946).

**Brig**, a sailing vessel with two masts, both square-rigged. A brigantine differs from a brig in having no square mainsail.

**Brigade**, a tactical body of troops in the permanent organization of the United States Army, the division being the largest permanent unit in time of peace. An infantry brigade consists normally of three, but sometimes of two or four regiments. A cavalry brigade consists of two or three regiments and, when acting alone, has batteries of artillery attached. A brigadier-general is the normal commander of a brigade. See *ARMY*; *ARMY IN THE FIELD*; *Field Service Regulations, U. S. Army*.

**Brigadier-General**, in the U. S. Army, is the grade next above colonel and next below major-general. The appropriate command of a brigadier-general of the line is a brigade.

**Brigandine** (Low Lat. *brigans*, 'a light-armed soldier'), a mediæval (15th-16th century) coat of mail. The term is also applied to a jacket quilted with iron, worn by archers in the reigns of Elizabeth and James I.



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George Washington Bridge, Across the Hudson River, from New York City to Fort Lee, N. J.

**Brigands**, organized bands who practise general robbery, making their headquarters in fastnesses in forests or mountains, from which they sally forth to plunder travellers of their property, or seize and hold them until a ransom is paid for their liberation.

**Brigantes**, ancient British tribe who inhabited most of Yorkshire, Lancashire, Durham, Westmoreland, and Cumberland.

**Briggs, Charles Augustus** (1841-1913), American theologian, born in New York City. His address on 'The Authority of Holy Scriptures' caused his trial for heresy as opposing the Presbyterian Confession of Faith.

**Briggs, Charles Frederick** (1804-77), American author, was born at Nantucket, Mass., and removed to New York early in life where he established the *Broadway Journal*, 1844. Author of *Working a Passage; or, Life on a Liner* (1844).

**Brigham Young College**. A coeducational institution of the Mormon Church at Logan, Utah, established in 1877 by a gift of 9,642 acres of land from Brigham Young.

**Bright, Sir Charles Tilston** (1832-88), English telegraph engineer. His experiments in long-distance electric signalling resulted in the formation, with Brett and Cyrus W. Field, of the Atlantic Cable Company, of which Bright was appointed engineer-in-chief. The first cable (1857-58), after working sixty-eight days, proved a failure. Bright subsequently laid cables in the Mediterranean, the Persian Gulf (1864) and the W. Indies (1871).

**Bright, John** (1811-89), English orator and statesman, the son of Jacob Bright, a cotton-spinner and manufacturer. He fought for the repeal of the Corn Laws. He advocated remedial legislation for Ireland, including disestablishment of the church, free trade in land, and a liberal policy towards India.

In 1861, when the Civil War broke out in the U. S. he ardently supported the cause of the North.

When Gladstone came into office in 1868, Bright accepted the presidency of the Board of Trade. He gave powerful support at all stages to the Irish Church Disestablishment Act, the Irish Land Act, and the Elementary Education Act. When Gladstone introduced the Home Rule Bill for Ireland in 1886, Bright separated himself with pain from his old leader. See Bright's *Life and Speeches*, by G. Barnett Smith (1881); Robertson's *Life* (new ed. 1884); *Speeches* (published in 1868); *Public Letters* (ed. by H. J. Leech,

1895); and John Morley's *Life of Cobden* (Jubilee ed. 1896).

**Bright, Richard** (1789-1858), English physician to Queen Victoria; studied the disease to which his name was given, Bright's disease.

**Brighton**, watering place, Sussex, England, on English Channel, 50½ m. s.e. of London. Brighton's great popularity as a fashionable resort arose from the writings of Dr. Russell in the 18th century, the discovery of a chalybeate spring, the residence of George IV., and the facilities afforded to Londoners, especially by the opening in 1841 of railway communication. Brighton has always been connected with the fishing industry, and its boats still bring in many herring; p. 156,440.

**Bright's Disease**, See Nephritis.

**Brigit, Bridget, or Bride, St.** (453-523), of Kildare, founded the church of Kildare. Her day is February 1.

**Brignoli, Pasquale** (1824-84), Italian singer, was born in Naples, Italy. He was brought to the U. S. by Strakosch in 1855, and sang in grand opera with all the leading sopranos of his time.

**Bril, Paulus** (1554-1626), the earliest of the great 17th century Flemish landscape painters. He went to Rome with his brother Mattijs, and created a style at once grand, simple, and poetic. His works include landscapes in most European galleries.

**Brill**, a European fish closely related to the turbot, from which it is distinguished by its smooth skin, smaller size, and glistening spots.

**Brimstone**. See Sulphur.

**Brin, Benedetto** (1833-98), an Italian naval engineer and administrator. As minister of marine he developed the Italian navy, especially by the construction of the armored cruisers.

**Brindisi** (anc. *Brundisium*), seapt. tn., prov. Lecce, Italy, the only really good harbor between Venice and the extremity of Italy, stands on the Adriatic. It acquired renewed importance after the opening of the Suez Canal, as the land terminus of the 'overland' route to India. The trade aggregates nearly \$5,000,000 annually, and is about equally divided between exports (chiefly figs, wine, olive oil, coral, and silk) and imports (mostly coal). This town was an important shipping center under the Romans, when it was the chief port for Greece; p. 61,443.

**Brine Shrimps** (*Artemia*), small crustaceans found in the water of salt lakes, and

of interest because the naturalist Schmanke-witsch succeeded in transforming one so-called species into another by altering the salinity of the water.

**Brink, Jan Ten** (1834-1901), Dutch critic and novelist, was born in Appingedam. In 1884 became professor of Dutch literature at Leyden. His *Literary Sketches* (Dutch) were collected in 17 vols. (1882-8), and his *Novels* in 13 volumes (1885).

**Brinkerhoff, Roeliff** (1828-1911), American banker and penologist, was born in Owasco, N. Y. He was president of the American National Prison Congress and of the Ohio Archaeological and Historical Society (1893-1907), and was an advocate of the cottage plan for asylums, and of other reforms in the administration of public charities and prisons. He wrote *The Volunteer Quartermaster: Recollections of a Lifetime* (1900).

**Brinkley, Frank** (1844-1912), British editor and authority on Japan, entered the British army and in 1867 went to Japan with the Royal Artillery. He was Tokio correspondent of the *London Times* and was widely known as a student of Japanese history and politics.

**Brinton, Daniel Garrison** (1837-99), American anthropologist, was born in Thornbury, Pa. In 1886 he became professor of American linguistics and archæology in the University of Pennsylvania. Professor Brinton's researches in American archæology placed him among the foremost anthropologists of the world. He published and edited a *Library of American Aboriginal Literature* (8 vols., 1882-90), and wrote *Myths of the New World* (1868), etc.

**Brinvilliers, Marie Madeleine Dreux d'Aubray, Marquise de** (c. 1630-76), French poisoner, was married to the Marquis de Brinvilliers in 1651. Conceiving a passion for a young officer, Jean Baptiste Sainte-Croix, and having learned from him the secrets of poisoning, she in 1670 poisoned her father, two brothers, and sisters. She was beheaded and burned at Paris (July 16, 1676). Consult Bauplein's *La Marquise de Brinvilliers*; Stokes' *Madame de Brinvilliers and Her Times*.

**Brionian Islands**, in the Adriatic, opposite the harbor of Pola in Istria. Here are sandstone quarries whence the stone was obtained for building the palaces of Venice, and here the Genoese defeated the Venetians in a naval battle in 1379. The islands, formerly an Austrian possession, now belong to Italy.

**Briquette.** 1. A small, press-moulded lump of coal dust, fine ore, or similar material. See **BRIQUETTING**.

2. A small moulded block of hydraulic cement or mortar, of special shape, made for testing the tensile strength of the cement. The briquette is uniformly one inch thick, and its breaking load thus expresses directly the tensile strength of the cement in pounds per sq. inch. See **CEMENT**.

**Briquetting**, the process of consolidating fine coal, ore dust, or similar matter by pressing in moulds to form small lumps (*briquettes*) for subsequent treatment or utilization. Binding substances, such as pitch, lime, etc., are usually employed. Briquettes vary in size, according to their use, from small egg to half-brick size. The process makes it possible to utilize efficiently fine material which would otherwise be impossible or difficult of utilization. It has been applied extensively to coal, and to some extent to fine iron ores and the flue dust accumulated in smelting iron, copper, and other ores.

Coal briquetting is an important industry in Europe. In America it has found less use because of the comparatively low price of coal and the high price of binders. Briquetted coal gives a clean, smokeless fire; burns regularly and under good control, and gives little ash. These qualities make it a popular household fuel in Europe, where anthracite is costly.

Ore briquetting has acquired some importance as a means of utilizing the flue dust of furnaces and smelters, slimes, roasted sulphide ores, etc. The principal binders are lime, lime and clay, and a mixture of lime with soda ash and salt.

**Brisbane**, capital of Queensland, Commonwealth of Australia, is situated on the river of same name, 16 m. from Moreton Bay; 500 m. n. of Sydney. The mean temperature is 69°, and the rainfall annually averages 48.36 inches. Brisbane is a great trading and manufacturing centre. Wine, bananas, and pineapples are produced; and preserved and frozen meats, hides and skins, wool, tallow, butter, and other pastoral produce are the chief lines of export. Brisbane was settled as a penal station in 1825 by Sir T. M. Brisbane, governor of New South Wales. The era of progress began in 1842, when the colony was opened to free settlers; p. 469,000.

**Brisbane, Arthur** (1864-1936), American journalist, was born in Buffalo, N. Y. He began newspaper work in 1883 on the staff of

the New York *Sun*, was London correspondent and editor of the *Evening Sun*.

He then became managing editor of the *Evening World*, but in 1897 assumed the editorship of the New York *Journal*, published by William Randolph Hearst. For the first time he turned to the writing of editorials, an activity which developed into his widely-syndicated column, *Today*, which was said to have won between 30,000,000 and 40,000,000 readers. Brisbane became an outstandingly important factor in the Hearst publishing organization, from which he drew an annual salary of \$260,000. He bought the *Washington Times* in 1917, the *Milwaukee Evening Wisconsin* in 1918, and sold both papers to Hearst. In 1921 he became chief editorial writer for all the Hearst newspapers.

**Brisbane, Sir T. Makdougall** (1773-1860), British astronomer and colonial governor, was born near Largs in Ayrshire. He founded three observatories: two in Scotland and one at Parramatta, near Sydney, Australia.

**Briseis**, daughter of Briseus of Lyrnessus, was taken captive by Achilles during the Siege of Troy.

**Brisson, Eugène Henri** (1835-1912), French lawyer and legislator, was born in Bourges, studied law in Paris, and was called to the bar in 1859. He was Prime Minister of France (1885), and an unsuccessful candidate for the Presidency (1895 and 1899). He gained distinction as president of the Panama Commission, and for his unbiased administration, at the time of the Dreyfus case, as president of the Chamber of Deputies (1894-9). He wrote *Souvenirs: Affaire Dreyfus* (1908).

**Briassot de Warville, Jean (Jacques) Pierre** (1754-93), French revolutionist, was born near Chartres.

**Bristles**, the long, stiff hairs growing on the back and sides of the hog and wild boar. There are black, gray, yellow, silvery, and white bristles, the last named being the most valuable. Bristles are used chiefly in the manufacture of brushes, and constitute a valuable article of commerce.

**Bristol**, co., borough, and city, once the second town in England, stands on the River Avon, at the borders of Gloucestershire and Somerset. It has a famous Cathedral, which retains the site and part of the building of an Augustinian monastery founded by Robert Fitzharding, who began the erection of the Abbey in 1142. The present nave and west towers were completed in 1888. The

city is well provided with docks to handle its increasing trade; p. 442,281. There are plentiful traces of British and Roman occupation about Bristol, and silver pennies were struck here (978-1016) in the reign of Ethelred the Unready. The town was early infamous as a slave market. Yielding easily at the Conquest, it was fortified by Bishop Geoffrey of Coutances, its castle surviving till 1665. Notable events are the insurrection of 1313-14; the Black Death in 1349; the sailing of John Cabot, in 1497, on the voyage that resulted in the discovery of the mainland of North America; and the sailing of the *Great Western* in 1838. Bristol is the birthplace of Chatterton, Southey, and Hannah More. Consult Harvey's *Bristol*, and Stone's *Bristol* (1909).

**Bristol**, city, Connecticut, co-extensive with Bristol town, Hartford co., on Pequabuck River. It was settled about 1727 and was strongly loyalist during the Revolution. A cave here called 'Tories' den' was a meeting place of loyalists; p. 35,961.

**Bristol**, town, Rhode Island, county seat of Bristol co., on Narragansett Bay. The peninsula has been suggested as the Vinland of the Norsemen. Mount Hope, on the east side, was the seat of Massasoit and King Philip, the Narragansett chiefs. In 1681 it was incorporated in the colony of Rhode Island. In 1692 it was annexed to Massachusetts and in 1747 it became a part of Rhode Island again. Bristol was burned by the British in 1778; p. 12,320.

**Bristol Bay**, an arm of Bering Sea, between the southern headlands of the Yukon Land District and the Alaska Peninsula.

**Bristol Board**, a fine pasteboard with a smooth and sometimes glazed surface, originally manufactured in Bristol, England. It is composed of thick, stiff paper, and is used chiefly by artists and draughtsmen.

**Bristol Channel**, an arm of the Atlantic Ocean, on the west coast of England, separating South Wales from Devon and Somerset, and extending from the mouth of the Severn to St. George's Channel (80 m.). It is the largest inlet of Great Britain, having an irregular coast line of 220 m. The rapid tides, meeting the waters of the Severn, cause the upheaval known as 'the Bore.'

**Britain**, the ancient name for the British Isles. It is of uncertain origin, but is usually ascribed to a Celtic source, still undetermined. See GREAT BRITAIN; ENGLAND AND WALES; SCOTLAND.

**Britannia Metal**, an alloy consisting of

80 to 90 parts of tin, 8 to 20 of antimony, and sometimes small quantities of copper, zinc, lead, or bismuth. It is harder than tin, takes a good polish, and is capable of being silver plated. It is used for making spoons and teapots.

**Britannicus** (24-45 A.D.), son of the Emperor Claudius and Messalina, obtained his name from the victories which his father was held to have won in Britain.

**British Association for the Advancement of Science**, the chief scientific association in Great Britain. The first meeting was held in York on Sept. 27, 1831. Sir David Brewster was the practical founder of the association, which now numbers about 5,000 members. A large income yields a surplus which is devoted to grants for special researches conducted by committees of the association.

**British Central African Federation**, since 1953 a union of Northern and Southern Rhodesia and Nyasaland Protectorate, in South Central Africa. It has an estimated area of 488,060 sq. m., and an estimated population of 6,729,700, including 6,500,000 Africans, 207,400 Europeans, and 22,300 Asiatics and Colored. Northern and Southern Rhodesia each have a governor, an executive council and a legislature. The topography is a plateau, diversified with mountain ridges. The Shire Highlands consists of a mountainous country in the south-eastern part, with a fertile well-watered soil. The principal rivers are affluents of the Zambezi. The country is comparatively healthful; but malarial and blackwater fever and sleeping sickness occur.

The flora is fairly abundant. Forests range from dense evergreen mountain forests to very open acacia or palm tree savannahs of the lake-shore. The fauna includes the antelope, hippopotamus, rhinoceros, impella, eland, zebra, lion, leopard and buffalo. Agriculture is the chief occupation, and tobacco, tea, fibers, maize and millet, beans, rubber, coffee, potatoes, wheat, groundnuts, cotton, and chillies and capsicums are the chief products, named in order of value. The chief exports are tobacco (four-fifths of the total), tea, cotton, fibre, coffee, strophanthus, cotton seed, beeswax, ivory, maize and maize flour, and potatoes. About 84 per cent goes to Great Britain. Transportation is usually by cart or rickshaw. The railways of each state are connected with each other and with those of the Union of South Africa, the Belgian Congo, the Angola line, and the Beira

Railway through Mozambique. The states also have common radio, airways and statistical services. See also **NYASALAND PROTECTORATE**; **RHODESIA**. Consult H. H. Johnston's *British Central Africa* and R. C. F. Maugham's *Africa as I Have Known It*.

**British Columbia**, the most westerly province of the Dominion of Canada, is bounded on the west by the Pacific Ocean and a narrow projection of Alaska; on the north by the 60th parallel; on the east by Alberta; and on the south by the straits of Juan de Fuca and the 49th parallel of north latitude which mark the international boundary between Canada and the United States. Together with the former crown colony of Vancouver Island (area 12,408 sq. m.), it has an area of 366,255 sq. m. of which 6,976 are under water. On the east are the Rockies and Selkirks, and on the west the Coast and Island ranges. The last is partly submerged, Vancouver and Queen Charlotte Islands being the most prominent features. Most of the mainland scenery is wild and picturesque, while the coast line, approximately 4,400 m., is deeply indented by a succession of extensive fiords and long narrow inlets comparable to the fiords of Norway. The most important rivers are the Columbia or Oregon on the south, the Skeena, and the Stikine, the Liard, and the Peace. These rivers are of great size and volume, and the first four are sufficiently navigable in stretches to be of great service in the development of the country. The highest point is Mount Fairweather, in the Rockies, with a height of 15,300 ft. Mount Robson is 12,972 ft. high and Waddington, 13,260 ft. The climate varies greatly, being milder in the south than that of regions in the same latitude on the Atlantic coast.

The fauna includes a large number of wild animals and game. Among the quadrupeds may be named the white, grizzly, and black bear, moose, wapiti, caribou, mule deer, white-tailed and Columbian deer, mountain goat, big horn or mountain sheep, cougar, wolf, coyote, wildcat, polecat, skunk, black, silver, and cross fox, racoon, beaver, marten, mink, wolverine, Northern hare, Baird's hare, and muskrat. Marine animals include the sea lion, fur seal, hair seal, and sea otter. The bird life includes the blue and ruffed grouse, ducks, geese, snipe, pheasants, European partridges, quail, prairie chicken, ptarmigan, black brant, teal, mallard, widgeon, merganser, crane, curlew, plover, American magpie, and oriole.

A large part of the land is densely wooded,



*Courtesy of the Canadian Pacific.*

*British Columbia.*

Mt. Sir Donald (10,808 feet) in the Selkirk Range of the Canadian Rockies.

many of the trees are exported in large quantities. The Douglas fir, which sometimes attains a height of 300 ft. and a girth of 40 ft. is in demand for shipbuilding. British Columbia forests hold the greatest stand of soft-

wood in the Empire and 34 per cent of Canada's standing timber. Fisheries comprise the fourth ranking industry, the value of the catch being 36.2 per cent of the Dominion's total. Once fur-sealing was important but is



declined as a result of indiscriminate killing of seals in Bering Sea, and the disputes with Russia, Japan and the United States.

The most important fisheries of British Columbia (about three-fifths of the total) are the estuarian salmon fisheries of the Fraser, Skeena, Nass, and other rivers. The sockeye is in great demand in the overseas markets because of its deep-red color and fine texture. A treaty was ratified in 1930 by Canada and the United States establishing the International Pacific Salmon Fisheries Commission, with three members from each country to control the sockeye salmon fisheries of the Fraser River region, the treaty to continue for 16 years, after which it may be terminated on notice of one year by either government. Next in importance is halibut fishing. An International Halibut Commission was set up under a treaty signed by Canada and the United States in 1930, to regulate the taking of halibut. Herring is found in local waters (annual catch worth about \$1,500,000) and marketed fresh, canned, smoked, pickled, drysalted, and for reduction to oil and meal. Deep-sea whalers catch about 300 whales annually, the oil being in demand for tanneries. Cod is plentiful. Trout, shad, flounder, sturgeon, bass, oolakan, candle fish, anchovy and smelt abound. The value of the fishery products for 1940 was \$18,726,000.

British Columbia produces about one-fifth of all Canada's mineral output, ranking second among the provinces. It is said to be the richest mining region in the Americas. Mining of uranium ore, according to 1952 figures, was approximately one-tenth of the total output of Canada. Coal is exceedingly abundant not only in the Rocky Mountains but elsewhere. The province is notable for its deposits of gold, gold-silver, gold-copper, copper, copper-iron, and lead-zinc ores.

The industries covering wood and paper, central electric stations, non-ferrous metals, and shipbuilding, all rank high in comparison to the total investment of manufacturing industries in the provinces.

In 1952 the first newsprint plant was erected at Duncan Bay, Vancouver Island. In the same year, at a cost of approximately a hundred million dollars, the province engaged in the construction of the natural gas pipe line from Alberta through Central British Columbia to the lower mainland. During 1952-1953 construction of roads and bridges was undertaken, at a cost of thirty-two million dollars.

The third ranking industry is agriculture,

which is relatively intensive, depending mainly on tree and bush fruits, berries and vegetables. Fur trading yields about one and one-third million dollars annually. Fur farming is increasing, due to the favorable climate. Foxes (silver, cross, red and blue) martens, weasels, fishers, racoons, mink, karakul, skunks, sheep, beaver, lynx and muskrat are bred on fur farms. The railway mileage is about 5,300, the three principal lines being the Canadian Pacific, the Canadian National, and the Pacific Great Eastern. From the ports of Vancouver, Victoria, Prince Rupert and New Westminster, ocean ships sail in all seasons to all parts of the world. There are airports at Victoria, Vancouver, Trail, Grand Forks, Fernie and Chilliwack, and seaplane bases at Vancouver and Swanson Bay.

Education is compulsory from the age of 7 to 15. There is a complete system of free and non-sectarian schools of all grades through to the university. British Columbia is administered by a lieutenant-governor, with executive cabinet, and a legislative assembly of 48 members. The province is represented in the Dominion Senate by six members and in the House of Commons by 14. 1951 census shows a population of 1,165,210. The chief cities are Greater Victoria (the capital of British Columbia) population 51,331; Greater Vancouver, population 344,833; New Westminster, population 28,639; Nanaimo, population 7,196; Prince Rupert, population 8,546; Nelson, population 6,772. There are 25,000 each of Indians, Japanese and Chinese.

The first authenticated visits to the country were made by Bodega and Heceta in 1775, and by Captain Cook three years later. After Capt. George Vancouver had surveyed the coast, Spain concluded a treaty with England, ceding Nootka and paying an indemnity. In 1918 a treaty was made between England and the United States defining the limits of the two territories; and the Alaska Boundary Commission definitely settled the frontier with Alaska in 1903. Vancouver Island was proclaimed a British colony in 1849, and the mainland received the name of British Columbia by imperial edict in 1858. In 1866 the two colonies were constituted a single province and in 1871 British Columbia became a province of the Dominion of Canada.

Consult Albee, R. S. and William, *Alaska Challenge* (1940); Rothery, A. E., *The Ports of British Columbia* (1943); Hutchison, Bruce, *The Fraser* (1950).

**British East Africa**, comprising the Crown Colony and Protectorate of Kenya, the Uganda Protectorate, Tanganyika (a Trust Territory), and British Somaliland (a Protectorate). The main products are coffee, tea, cereals, sisal, dairy products, timber, minerals, cotton, hides, ivory, and sugar. It is bounded on the south by Mozambique and on the north by the Anglo-Egyptian Sudan and Ethiopia. In 1905 British East Africa was taken over from the Foreign Office by the Colonial Office. In 1920 the Kenya Colony became a 'Crown Colony.' Nairobi is its capital. Zanzibar is 23 m. off the coast. British East Africa has a combined area of 749,629 sq. m.; p. 19,404,000. See also **KENYA COLONY AND PROTECTORATE; SOMALILAND; UGANDA PROTECTORATE.**

Consult Sir F. J. Jackson's *Early Days in East Africa*.

**British Empire**, the complex association of political communities united under a common allegiance to the British Crown, comprising Great Britain and Northern Ireland, the self-governing Dominions, also the Colonies, Protectorates, and Dependencies. Territories administered under mandate of the United Nations are also usually included. The total area of the British Empire, including mandated territories, is 12,992,102 sq. m. Of this approximately 30 per cent. is in North and South America and adjacent waters; 24 per cent. in Australasia and the Pacific; 29 per cent. in Africa; 16 per cent. in Asia and only 1 per cent. in Europe. The earliest efforts to establish colonies took place along the shores of North America. The first of these was made by Sir Humphrey Gilbert in Newfoundland, in 1583, followed shortly by a small English settlement on the coast of Virginia. The greater part of the British Empire has, however, accrued in comparatively recent times. By the middle of the 18th century the British colonial possessions stretched from New England to Georgia. These colonies, breaking away in the Revolution of 1776, led to the foundation of the United States of America. In addition to the New England Colonies, the Treaty of Utrecht (1713), terminating the War of the Spanish Succession, left Great Britain in possession of Newfoundland, New Brunswick, Nova Scotia, St. Helena, the Bermudas, Jamaica, Barbados, the Bahamas, the Virgin Islands, and Gibraltar. The supremacy of British interests in India and the Pacific was also recognized, during the latter half of the 18th and early 19th centuries. Toward the end of

the 19th century, Natal, Rhodesia, Bechuanaland, Basutoland and the Transkei and Zululand, all in Africa were occupied. British Columbia and the Northwest Territories were added to Canada. Australia, New Zealand, British New Guinea, and North Borneo were occupied. By cession, Hong Kong, Labuan, Lagos, and the greater part of the old Coast and the Fiji Islands were secured, and the Island of Cyprus and the basin of the lower Niger were acquired by arrangement with the other powers. In 1890, by agreement with Germany, France, and Portugal, the possessions and spheres of interest of those powers in the African continent were limited, resulting in large additions to the Empire. In consequence, British jurisdiction has been established over the territories now known as Kenya, Zanzibar, Uganda, Nyasaland, British Somaliland, the Protectorate of Nigeria, the Northern Territories of the Gold Coast, and the Protectorate of Sierra Leone. After the Boer War in 1900, the South African Republics were annexed to the Empire, paving the way to the union of the chief British colonies in South Africa. The Malay Peninsula, except that part belonging to Siam, is now also under the British Crown.

During World War I (1914-18), Great Britain and the dominions undertook the seizure of many of the Germany colonies. Under the Treaty of Versailles, the principle of international mandates was established to deal with these colonies. The constitutional development of the Empire as a whole can best be indicated by classifying its component units in nine political groups. In the first group is Great Britain, the home and centre of the British Constitution, which is the model, both in form and tradition, upon which all advanced political institutions within the Empire have been, or are being, fashioned.

In the second group are the self-governing dominions, *viz.* Canada, Australia, South Africa, and New Zealand. These possess the fullest rights of self-government within the Empire, under constitutions closely following the British Constitution in fundamentals. At the Imperial Conference of 1926, they were declared to be equal in status and in no way subordinate to one another or to Great Britain in any aspect of their domestic or external affairs.

In 1947 India was granted independence and divided into two states: Hindustan and Pakistan. Newfoundland constitutes a fourth group, its position being midway between that of the dominions and the Colonies in the

fifth group. Malta and Southern Rhodesia make up the fifth group; they have responsible government in internal affairs, but they are subject to certain constitutional limitations.

The sixth group consists of a large number of Colonies with local legislatures in which the Executive is appointed by the Crown and is not responsible to the country. The seventh group is composed of colonies and protectorates governed directly or indirectly by the Crown, without representative institutions in the European sense, but with native advisory councils in some cases. Eighth is the Sudan, which is under British administration without representative institutions. Ninth, and last, there are the territories administered or protected by virtue of International Mandates. These for the most part are still without advanced political institutions.

The Imperial Conference was constituted under a resolution of the Colonial Conference in 1907, for the purpose of discussing questions of common interest as between the British Government and the governments of the self-governing dominions. It is purely advisory and consultative in character. It has since that time met at intervals averaging from three to five years, with important results in increased independence for its colonial members.

The troops of the self-governing dominions gradually took over from Great Britain the work of local defence. Gibraltar, Malta, and the Straits Settlements have British garrisons. The defence of the Empire, however, rests primarily on the British navy assisted by the dominions. The Japanese (1941-45) occupied British Malaya, British Solomon Islands, Burma, Hong Kong, the territory of New Guinea, the Andaman Islands, and some of the Gilbert and Ellice Islands; also threatened the Australian mainland.

See articles on the countries comprising the Empire, e.g., ENGLAND AND WALES, SCOTLAND, IRELAND (NORTHERN); CANADA; AUSTRALIA, etc. Consult Egerton, H. E., *A Short History of British Colonial Policy, 1606-1900* (9th ed. 1932); Adams, G. B., *A Constitutional History of England* (rev. ed. 1934); Adams, J. T., *Building the British Empire*. 2 vols. (1938-42); Cross, A. L., *A Shorter History of England and Greater Britain* (3rd ed. 1939); Viton, Albert, *Great Britain* (1940); Goshal, Kumar, *People in Colonies* (1948).

**British Guiana**, the only British possession on the continent of South America, lies on the n. coast, having Dutch Guiana, Brazil,

and Venezuela on the e., s., and w. respectively. It has an area of about 83,000 sq. m. The colony may be roughly divided into three belts: a low-lying, flat, and swampy portion on the n., bordering the coast; a second more elevated tract composed of sand and clay, in the centre; and a still more elevated portion in the s., containing the principal mountain chains in its western part. The climate is hot, but the range of temperature is slight. The flora is that common to tropical S. America. The Falkland Islands lie off the coast.

British Guiana is rich in gold; it is washed in all the river valleys, from the Barima in the west to the Berbice. The sugar industry is the most important in the colony, and sugar and its by-products, rum, molasses, and molascuit, constitute the major part of its exports. Trade is chiefly with Great Britain and Canada. The ports are Georgetown, the capital, and New Amsterdam. The settled part of the country is about one-tenth of the whole, and lies near the coast, along the navigable rivers. Here there are 322 miles of good roads and 79 miles of railway. The colony has telegraphic communication with Europe and the United States, and it also has a good system of postage.

The inhabitants are chiefly Portuguese from Madeira, Negroes, East Indians, and Chinese (settlement, Hopetown). The aborigines (Caribs, Arawaks, and others) number about 9,150; the population of the colony, about 452,600.

**History.**—The Dutch first settled on the Pomeroon River early in the 17th century. In the following century colonization began in earnest, and Essequibo, Demerara, and Berbice were established. In 1781 the British captured these settlements, occupying them until 1783, and again from 1803 to 1814, when the present colony was formed, except that Berbice was administered separately down to 1831. British Guiana has had many frontier disputes with Brazil and Venezuela. (See VENEZUELA).

**Bibliography.**—Consult J. Rodway's *History of British Guiana, and Guiana—British, Dutch, and French* (1912); H. Kirke's *Twenty-five Years in British Guiana*; Harrison's *Gold Fields of British Guiana*; Harrison and Stockdale's *Rubber and Balata in British Guiana* (1911); Harris and De Villiers' *Rise of British Guiana* (1911).

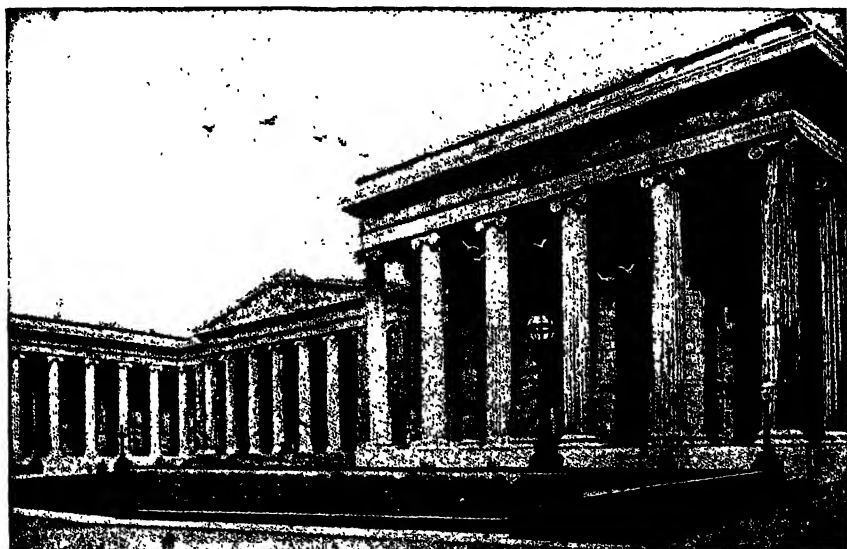
**British Honduras**, a British crown colony on the Caribbean Sea and the east coast of Central America, between the Mexican state of Yucatan and Guatemala. The more

accessible forests having been well worked, the quality of the timber is declining; but the cultivation of chicle, fruit, cacao, sugar, and india rubber is being extended. The climate generally is damp and hot, but not unhealthy. The capital and chief port is Belize. Area, 8,867 sq. m.; p. 70,000. Consult Aspinall, A. E., *Pocket Guide to the West Indies* (9th ed. 1940).

**British Isles, The**, an extensive archipelago w. of the Continent of Europe, from

acceptance of this offer and for the purchase of other collections, for the location of which Montague House, Bloomsbury, was purchased for \$51,250, and opened (in 1759) under the title of the British Museum.

Since that time the collections and libraries have increased rapidly, with frequent new and valuable additions, as, for instance, the Elgin marbles including the Parthenon sculptures, important Assyrian and Egyptian sculptures including cuneiform tablets and



*The British Museum.*

which it is separated by the North Sea, the Strait of Dover, and the English Channel. The whole archipelago consists of the two large islands of (a) Great Britain, comprising England, Wales, and Scotland; (b) Ireland; together with (c) about 5,000 small islands lying in groups to the north (Orkney and Shetland), to the west (Hebrides, Isle of Man, the small coast islands of Ireland, and the Scilly Islands), and to the south (Isle of Wight and the Channel Islands, the last named belonging geographically to France). Total area, 121,390 sq.m. See ENGLAND AND WALES, SCOTLAND, IRELAND, etc.

**British Museum.** In 1753, under the will of Sir Hans Sloane, his books, natural history collections, and curiosities were offered to the British nation for the sum of \$100,000, on condition that they should be kept together in a museum. An Act of Parliament was passed the same year, providing for the

slabs in other scripts, and remains of all periods of civilization. The Grenville library, presented in 1847, has been followed by a succession of priceless libraries. Since the middle of the 19th century it has been the rule that, a copy of every book printed in the United Kingdom must be delivered to the museum within one month of publication. Housed in spacious quarters, the Museum has become one of the chief centres of learning, attracting scholars from all over the world.

While the usefulness of the museum must always be gauged by the help it renders to real students, much of late years has been done to increase its popularity with casual visitors. To every article exhibited is attached a label, giving its name, and where needed, something of its history. In departments, the bulk of whose treasures cannot be displayed, selections are placed in show cases

among the most interesting of which are those containing autographs of celebrated personages, ancient, Oriental, and illuminated manuscripts, books illustrating the history of printing. The museum was badly damaged by Ger. air bombings, 1941.

**British North America Act**, passed by the British Parliament (March 29, 1867) to provide for the union of Canada, Nova Scotia, and New Brunswick into a federation with the title of 'The Dominion of Canada.' The Dominion now includes the whole of British North America, except Newfoundland and the Bermudas.

**British Thermal Unit**. The amount of heat required to raise one pound of water through one degree Fahrenheit, abbreviated B.T.U.

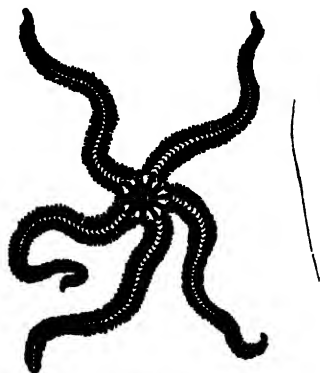
**Britomartis**, a Cretan divinity, daughter of Zeus and Carne; like Artemis, a virgin huntress.

**Brittany** (French *Bretagne*), the great northwest peninsula of France, extending in a triangular form into the sea, its base resting on Normandy, Maine, Anjou, and Poitou, its sides washed by the Channel and the Atlantic Ocean.

Though the height of its mountains nowhere exceeds 1,150 ft., their structure gives to the peninsula a wild and savage aspect. Clay slate forms the centre of the country, and masses of granite rise in the n. and s. The climate is often foggy, and subject to violent storms of wind. The peculiar shut-in situation and the characteristics of soil and climate in Brittany seem to have had a powerful effect on the character of its people. The Bretons would be ignorant and uncivilized but for a quite extraordinary wealth of traditional song and story, that serves effectively all the purposes of a national culture. Perhaps nowhere in the world has folklore reached such a high development; but no traditional stories come near the Breton folk tales, no popular poetry the Breton folk songs. No part of Europe contains so many megalithic monuments as Brittany. In ancient times, Brittany was the centre of the confederated Armorican tribes, who were of Celtic origin. Already entirely liberated in the 4th century, it became divided into several allied republican states, which afterward passed into petty monarchies. Brittany became subject to the Franks in the reign of Charlemagne, and was handed over by Charles the Simple to the Northmen in the 10th century. After fierce struggles, the Bretons at length acknowledged the suzerainty of the Norman dukes. The duchy of

Brittany was incorporated with France in 1532 by Francis I. See BRETON LANGUAGE AND LITERATURE.

**Brittle-stars**, Ophiuroidea, one of the classes of Echinodermata, not far removed from starfishes, but differing in their more centralized body, more sharply defined arms, and more active habits. See ECHINODERMATA.



*Brittle-star.*

**Brixham**, seaport, Devonshire, England, 25 m. s. of Exeter. It is the headquarters of the Torbay fishing industry, and great quantities of fresh fish are sent to London, Bath, and Bristol. A cavern 600 ft. long on Windmill Hill, discovered in 1858, contained bones of the mammoth, rhinoceros, horse, reindeer, hyena, bear, etc., besides palæolithic flint implements. William of Orange landed here in 1688; p. 8,761.

**Brixlegg**, village, Tyrol, Austria. The village stands in a beautiful position, which makes it a favorite summer resort. Passion plays were represented here; p. 1,200.

**Briza**, or **Quaking Grasses**, a small genus of plants characterized by their short, broad, flat leaves.

**Broach**, or **Bharuch**, town, Gujarat, Bombay Presidency, India. Eighteen hundred years ago Broach was one of the chief ports of West India. Since 1803, it has remained a British possession. The district of Broach has an area of 1,467 sq.m., and a population of 300,000.

**Broadbill**, a popular name for certain birds. See SCAUP; SPOONBILL.

**Broadhurst**, George H. (1866-1937), American playwright, author of successful plays and musical comedies, *The Man of the Hour*, *What Happened to Jones*, *Bought and Paid For*, and many others.

**Broads, The**, a series of picturesque shallow fresh-water lakes in Norfolk and Suffolk, England.

**Broadsides**. See **Chapbooks**.

**Broadsword**. See **Fencing**.

**Broadway**, principal street in New York City.

**Broca, Pierre Paul** (1824-80), French anthropologist founded the Anthropological Society of Paris, established *La Revue d'Anthropologie*, and opened the famous Ecole d'Anthropologie in Paris, published many scientific works.

**Brocade**, a silken fabric with a pattern of raised figures.

**Broccoli**, a hardy variety of cauliflower.

**Brochure**, a French term equivalent to 'the English pamphlet.'

**Brock, Sir Thomas** (1847-1922), English sculptor. Probably his finest work is the Queen Victoria Memorial before Buckingham Palace, on which he spent nine years.

**Brocken**, or **Blocksberg** (anc. *Mons Bructerus*), the central summit of the Harz Mountains, Germany. Here on the night of the first of May (Walpurgis night) the witches were said to hold their unholy revels. The mountain is also interesting for the 'spectre of the Brocken,' caused by shadows falling upon a wall of mist at sunrise.

**Brockhaus, Friedrich Arnold** (1772-1823), German publisher and lexicographer, founder of the house which bears his name. He edited and translated many Sanskrit works.

**Brockton**, city, Massachusetts, 20 m. s. of Boston. It is a flourishing industrial city, being especially known for its boot and shoe interests; p. 62,860.

**Brockway, Howard** (1870- ), American pianist and composer, began composing at an early age, and his *Sylvan Suite* was given by the Boston Symphony Orchestra in 1901.

**Brockway, Zebulon Reed** (1827-1920), American penologist, organized the Reformatory at Elmira, N. Y., of which he was superintendent from 1876 to 1900, and there introduced the indeterminate sentence which has had so great an influence in matters of prison reform. Consult his *Fifty Years of Prison Service* (autobiographical).

**Broadhead, John Romeyn** (1814-73), American historian. His *History of the State of New York* (2 vols. 1853-71) is the standard work on the period covered, (1609-91). From 1841 to 1845, as the agent of New York, he collected in the archives of

Europe historical material of great value, which was published as *Documents Relating to the Colonial History of the State of New York*.

**Brogue**, any one of a variety of heavy shoes. The term is also applied to the Irish dialect.

**Broken Hill**, town, New South Wales, Australia, has the most prolific silver mines in the world.

**Broker**, primarily an agent employed to negotiate purchases or sales of goods or other property. A broker does not have possession of the property to which his employment relates, but acts only as a middleman between the real parties to the transaction. For this reason he can neither sue nor be sued with respect to the contracts into which, as broker, he enters. If however, a broker, although in reality acting as an agent, does not purport to do so, personal liability attaches to him. The term broker is employed in a secondary sense and by analogy to describe persons employed in certain negotiations which do not involve the sale of property, as insurance brokers, and ship brokers. See **PAWNBROKER**.

**Brome Grass**, a genus of annual or perennial grasses found chiefly in the north temperate zone. The genus contains a few forage grasses and many troublesome weeds.

**Bromeliaceæ**, the **PINEAPPLE FAMILY**. A natural order of monocotyledonous plants, entirely confined to America, and abounding chiefly in the tropical and southern portions of that continent. Many of the species attach themselves to tall trees by means of aerial roots, without, however, obtaining from them any food material. Such for example, is the Spanish moss widely known for its trailing gray stems, especially luxuriant on the live-oaks. It is frequently employed as a substitute for horsehair in cushions.

**Bromfield, Louis** (1898-1956), Am. author. Pulitzer Prize novel *Early Autumn* 1926; *Twenty-four Hours* (1930); *The Farm* (1933); *Here Today* (1934); *Wild Is the River* (1941); *Mrs. Parkington* (1943); *Pleasant Valley* (1945); *Mr. Smith* (1951).

**Bromide**. See **Bromine**.

**Bromidrosis**, offensive perspiration caused by strong foods, diseases, and uncleanness.

**Bromine** (Br, 79.92) is an element of the halogen group, and has been known since 1826, but was not prepared in any quantity until 1860. It is present in traces in sea-water, but is usually obtained from the mother liquor of the Stassfurt potash beds, in which it is present as magnesium bromide, or from

American brines, particularly in Michigan and West Virginia.

Bromine is a heavy (sp. gr. 3.2), mobile, reddish-brown liquid; it is the only liquid non-metallic element. It boils at 59° c., and gives off a dark-red gas; also readily volatilizing at ordinary temperatures. The gas has a strong, disagreeable odor, similar to that of chlorine, and has a most irritating effect on the eyes. It produces painful sores if spilled on the skin, and has been used—though not to a great extent on account of expense—as a disinfectant. It is chiefly employed for the preparation of its compounds, used in photography and medicine, in the manufacture of coal-tar dyes, and of tetra-ethyl lead for use in motor fuel. The bromides chiefly used in medicine are those of potassium, sodium, and ammonium. Bromides are powerful depressants of the nervous system, and hypnotics.

**Bromios**, another name for Dionysos, one of the ancient Greek gods.

**Bromoform** (CHBr<sub>3</sub>) is the bromine analogue of chloroform, used as a heavy liquid, for separating and determining the density of minerals.

**Bronchi**, the two primary divisions of the trachea or windpipe, leading to the right and left lung respectively. The right bronchus is about one inch in length, and the left nearly two inches long. The bronchi are tubes of fibro-elastic membrane. Lining the tube is the mucous membrane, covered with ciliated epithelium. On entering the lungs the bronchi divide and subdivide into smaller branches or bronchioles, which penetrate into every part, until at length they end in the small subdivisions of the lungs called lobules.

Foreign bodies sometimes lodge in the bronchi producing more or less complete obstruction. They may be located and removed by means of the bronchoscope, similar in principle to the speculum.

For diseases of the bronchi, see BRONCHIECTASIS; BRONCHITIS. See also LUNGS.

**Bronchiectasis**, dilation of the bronchial tubes associated with inflammatory changes in the mucous membrane and thickening or thinning of the bronchial walls.

**Bronchitis**, inflammation of the mucous membrane of the bronchial tubes, may be acute or chronic.

*Acute bronchitis* is one of the commonest of respiratory diseases. It is particularly prevalent in the changeable weather encountered during the spring and late fall. The principal symptoms are cough, slight fever, and in the

later stages profuse muco-purulent or purulent sputum.

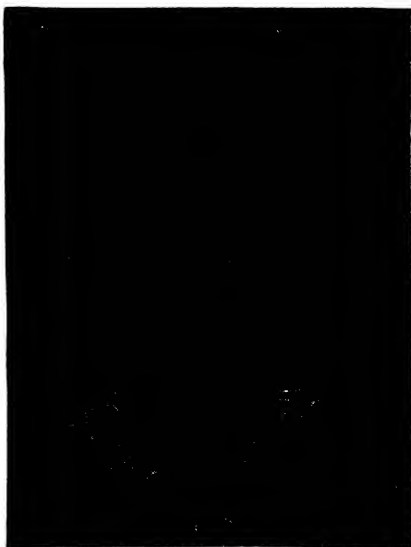
*Chronic bronchitis* is usually associated with some pulmonary condition. It occurs most frequently in persons beyond middle life and is seen more often in the winter than in the summer.

**Broncho**, or **Bronco**, a small horse or pony, native of the western plains of North America, and probably descended from horses escaped from early explorers though some think them descended from original American stock. They are hardy and are used chiefly as saddle and pack horses.

**Bronchophony**, the sound of the voice when heard through the stethoscope, applied over a healthy bronchus. Heard elsewhere it indicates consolidation of lung tissue—pneumonia. The sound is as if the patient were speaking directly into the stethoscope.

**Brongniart**, **Alexandre** (1770-1847), French naturalist, mineralogist, and geologist, perfected the art of painting on glass and wrote extensively.

**Bronson**, **Walter C.** (1862-1928), American educator and writer, his works including *Short History of American Literature* (1900) and *American Prose* (1916).



Charlotte Brontë.

**Brontë**, **Charlotte** (1816-55), celebrated English novelist, daughter of Patrick Brontë, rector of Haworth. Her mother died when Charlotte was about six years old, and she

her brother, Branwell, and her sisters Emily and Anne were cared for by their father, a somewhat solitary and eccentric man, and their aunt, Miss Branwell.

She had a desultory experience as pupil, housekeeper at home, and teacher, for which she was quite unfitted by temperament. In 1842 she persuaded her aunt to advance the money to allow her and Emily to study at Madame Héger's school in Brussels, thus better fitting themselves for teaching. In 1844 Charlotte returned to Haworth, Emily having preceded her two years earlier, after only a few months abroad.

The remainder of her life Charlotte spent at Haworth, engaged in family duties and in writing. Many griefs saddened these years, Branwell, Emily and Anne all dying within one year. In 1854 Charlotte married Rev. Arthur Nicholls, her father's curate, and after a brief period of happiness, died March 31, 1855.

The first of Charlotte Brontë's literary work to be published was included in a collection of *Poems* by the three sisters, which appeared under the pseudonym Currer, Ellis, and Acton Bell, in 1846. This Charlotte followed by *The Professor*, which could find no publisher, but was the occasion of a request for a longer novel, forthcoming in 1847 as *Jane Eyre*. *Jane Eyre* was an instant success, and completely altered the trend of its author's life, for it brought her into correspondence with Thackeray, Miss Martineau, and other people well known in the literary world.

In 1849, Charlotte completed *Shirley*, which was a portrait of Emily. Personal reputation and association with her literary equals now came to the novelist. *Villette* was her last novel.

The Brontë family were all extremely gifted. BRANWELL (1817-48) was an artist of ability. ANNE (1820-49) wrote two stories *Agnes Grey* (1847) and *the Tenant of Wildfell Hall* (1848) which show unmistakable evidence of talent and imagination. Consult Gaskell, E. C. S., *Life of Charlotte Brontë* (repr. 1908); Braithwaite, W. S. B., *Bewitched Parsonage* (1950).

Brontë, Emily (1818-48), the fifth child of Patrick and Maria Brontë, was born in Haworth where she spent most of her short life. Aside from her poems, published with those of her sisters in the collection of *Poems*, by Currer, Ellis, and Acton Bell, her only work is *Wuthering Heights* (1847), a novel extraordinary in its portrayal of vehement

passion and grief. The story itself is badly constructed but the drawing of the characters masterly, the style is faultless, and the author's dramatic instinct never fails.

Brontometer, a meteorological apparatus for studying thunderstorms, equipped with sensors which register the velocity of wind, atmospheric pressure, intensity of hail, and other phenomena.

Brontosaurus, a huge dinosaur belonging to the order *Sauropoda*. Fossil remains have been found in Wyoming and indicate a creature 60 feet long and about 10 feet high, with an extremely small head.

Brontotheriidae, gigantic extinct ungulate animals, the remains of which have been found principally in North America.

Bronx, The, most northerly of New York City's five boroughs, and fourth in area. Its name derives from that of Jonas Bronck the first white settler, who in 1641 purchased from the Indians 500 acres between the Harlem and Aquahung (later the Bronx) Rivers. With the opening of the subways in the early years of this century the Bronx began to grow rapidly in population, passing 1,000,000 in 1925 and reaching 1,451,277 in 1950. The population includes 30 percent of the total Jewish population of New York City. In 1894 three of the western townships of the Bronx were consolidated with New York City, but it was not until 1898 that the entire section was formally incorporated as one of the five boroughs. Bronx Park, which includes one of the country's finest zoological gardens, and Van Cortlandt Park a tract of 1,732.35 acres, are among the largest of a number of parks in the Bronx. See New York.

Bronze, an alloy of copper, usually, copper, 80 to 90 per cent., and tin, 20 to 10 per cent.: the tin may be partly replaced by lead and zinc. Bronze was one of the chief metals of antiquity. In modern times it has been used for the manufacture of cannon, though now superseded by steel; for coins; as bell metal, on account of its resonance; and for casts of statues, because of its fine color both when clean and when oxidized by the weather.

The term bronze has been broadened in modern practice to apply to a large class of metals consisting essentially of copper.

Bronze Age, a term applied to the second of three periods, i.e. Stone Age, Bronze Age, Iron Age, into which it has been convenient to divide the history of early man. This division holds good to a certain extent for both time and culture, though there is, of course, no fixed moment when any race ceased to use



stone, and learned to use bronze, implements. The dates generally assigned to the period are 2500 to 1800 B.C., but these cannot be accepted as definite, for in some areas this stage of culture may have been reached earlier, in others later. A Bronze-Age people in one region may thus have been contemporary with a Stone-Age people in another, and with an Iron-Age people in a third; that is to say, the succession of the three ages was not necessarily synchronous, either in contiguous or in widely separated areas. The Homeric poems depict the culture of a people passing from the use of bronze to that of iron. The Mexicans and Peruvians, on the other hand, were still in their bronze age in recent times.

The commonest and most characteristic objects belonging to the Bronze Age are the 'celts,' probably used for hoes, chisels, war-axes, and similar purposes. Other common objects are spears, swords, knives, shields, daggers, and articles of personal adornment. The forms of each class differ in different areas, and vary with advancing time. The ornamentation of the Bronze Age consists chiefly of concentric circles, spirals, and bosses. The workmanship is of a high order, the shapes graceful, and the finish fine. Many of the more difficult castings were turned out in a manner that would do credit to the most expert of modern workmen.

Consult Burkett's *Prehistory* (1925).

**Bronzes**, representations of objects and figures produced in bronze. This form of art has existed from very early times.

The difference between the bronzes of classical period and those of the Renaissance and modern times is chiefly one of conception and style. Greek work is impersonal, while in Renaissance and modern sculpture there is often an element of individuality and intimacy. The earliest Greek statues in bronze were apparently made by hammering the metal into thin plates which were joined by rivets, but this method was soon abandoned in favor of casting.

The Renaissance witnessed a marvellous revival of art in bronze as exemplified in the works of Cellini and others. Prominent among American workers in bronze are MacMonies, Bartlett, and Saint Gaudens. Besides sculptural works, collections of bronzes, contain implements and utensils of all periods. The Metropolitan Museum in New York City possesses one of the best collections of ancient bronzes in the world.

The East Indians, Chinese, and Japanese have handed down many fine examples of

bronze work, notably statues of Buddha. Consult Blacker, J. F., *The ABC of Japanese Art* (1911); Bachhofer, Ludwig, *A Short History of Chinese Art* (1946).

**Bronzing**, the process of giving a metallic or iridescent appearance to metal and other articles either by the application of a chemical bronzing solution or by dusting bronze powder on a surface previously prepared by coating with linseed-oil varnish.

**Bronzino**, Il (1502-72), the name given to ANGELO DI COSIMO, Italian painter of the Florentine school in its decline. His reputation rests on his careful portraits of prominent Florentines of his day. See Ruskin's *Modern Painters*; Sir E. J. Poynter's *Classics*.

**Bronzite**, so called from its sub-metallic lustre resembling tarnished bronze, a fairly common ingredient of igneous rocks.

**Brooch**, an ornament fastened to clothing by a safety-pin. Several types are distinguished: the Roman bow-shaped *fibula* of various metals; the Celtic, usually of bronze; and the Viking type, an oval, bowl-shaped brooch. Of more general mediæval forms may be mentioned the great clan brooches of precious metals set with crystal spheres and jewels, and the small gold brooches frequently inscribed with mottoes in French black-letter.

**Brook, Clive** (1891- ), born in London, England. In World War I, he joined the Artists' Rifles as a private in 1914, but was a major when the war ended. After appearing on the stage in London, he went to Hollywood, where he made a notable success in *Cavalcade*.

**Brooke, John Mercer** (1826-1906). American astronomer, invented the Brooke gun.

**Brooke, Rupert** (1887-1915), English poet and writer of exceptional promise died in the Dardanelles campaign, World War. His main reputation rests upon *The Collected Poems of Rupert Brooke* (1918).

**Brooke, Stopford Augustus** (1832-1916), Irish man of letters, wrote *Sermons*, collected in 4 vols. (1868-77); *Theology in the Eng. Poets* (1874); *Primer of Eng. Lit.* (1876), a wonderful little book; *Riquet of the Tuft*; a *Love Drama* (1880); *Study of Browning* (1901).

**Brook Farm**, a farm in West Roxbury, Mass., near Boston, the scene of the most famous of American socialistic experiments, originally an outgrowth of the philosophical and humanitarian movement in New England known as Transcendentalism. A little colony of idealists, under the leadership of George

Ripley, was established here in 1841, its official name being 'The Brook Farm Institute for Agriculture and Education,' whose objects, as officially expressed, were among others 'To more effectually promote the great purposes of human culture; to substitute a system of brotherly co-operation for one of selfish competition; to secure for our children, and for those who may be entrusted to our care, the benefits of the highest physical, intellectual, and moral education which, in the present state of human knowledge, the resources at our command will permit; to institute an attractive, efficient, and productive system of industry; and thus to impart a greater freedom, truthfulness, refinement, and moral dignity to our mode of life.' The employment of the members was to be determined by their respective aptitudes and capacities, and all kinds of labor were to be paid for equally.

The experiment, as at first organized, met with moderate financial success; the membership had increased by 1844 to seventy; and the school was particularly successful, attracting as students men who later became well known. Among the members, besides Ripley, were Nathaniel Hawthorne (for a short time), Charles A. Dana, and John S. Dwight; and among the visitors who took an active interest in the experiment were Ralph Waldo Emerson, Amos Bronson Alcott, and Margaret Fuller.

In 1844 the organization of Brook Farm was somewhat changed: a modified form of Fourierism was introduced and *The Harbinger*, to which many well known writers contributed, was founded. In the next few years, however, the interest in Fourierism declined; and in 1847 the society disbanded.

Consult *Letters from Brook Farm, 1844-47* (1928).

**Brookings Institution**, an association formed in 1927, Washington, D. C., for the purpose of conducting research in economics, administration of government and related fields. Robert Somers Brookings, American philanthropist, was founder and first chairman.

**Brooklime**, a small creeping plant belonging to the Scrophulariaceæ, growing in mud or shallow water in Europe.

**Brookline**, town, Massachusetts, a residential suburb of Boston, noted for the per capita wealth of its population and for the beauty of its residences and gardens.

**Brooklyn**, most populous of the five boroughs of New York City, is situated at the

western extremity of Long Island, on East River and New York Bay. It is coterminous with Kings County. Immense mercantile, manufacturing, and shipping interests, as well as a history and civic life, give Brooklyn a distinctive and important character. 'The Heights,' an elevation of the East River shore opposite the lower part of Manhattan is a fashionable residential section. Clinton, St. Marks, Washington, New York, and Brooklyn avenues are also fine residential streets, while the Shore Road section n. of Coney Island has many beautiful homes. Brooklyn's park system includes Prospect Park, one of the finest in the United States. From it extend the splendid Eastern and Ocean Parkways, the latter running to the beach at Coney Island. The Brooklyn Botanic Garden, opened in 1911, is under the direction of the Brooklyn Institute of Arts and Sciences.

Brooklyn is connected with Manhattan by three great bridges, the Brooklyn, the Williamsburg, and the Manhattan, and five subway tunnels. The borough is well supplied with subways, busses, elevated and surface car lines. The most widely famed churches are Plymouth Church, whose pulpit was occupied by Henry Ward Beecher for forty years, and the Church of the Pilgrims. There are numerous charitable institutions and hospitals. Brooklyn was settled by Walloons about 1636. In 1653 it received a Dutch charter, and in 1655, after the English conquest of New Amsterdam, it received an English charter. Brooklyn became a city in 1834. The city of Williamsburg and that of Bushwick were incorporated with it in 1855; New Lots was added in 1866, and, within the next ten years Gravesend, Flatbush, New Utrecht, and Flatlands were annexed. By State legislation in 1897 the city of Brooklyn became, on Jan. 1, 1898, the Borough of Brooklyn in the City of Greater New York. Originally playing a part subordinate to Manhattan in city politics, Brooklyn in recent years has come to be the largest voting unit in the city. As Manhattan Island's population declines, that of Brooklyn steadily increases. In 1950 it was 2,738,175, over 36% of the total (7,891,957) for the five boroughs.

Consult M. S. Welch, *Vrouw Knickerbocker; the Romance of the Building of Brooklyn* (1926).

**Brooklyn Bridge**. See New York City.

**Brooklyn Institute of Arts and Sciences**, a scientific and educational organization in Brooklyn, New York, incorporated in 1824 as the Brooklyn Apprentices' Library

Association and rechartered in 1843 as the Brooklyn Institute. It was reorganized in 1862 and again in 1890. The Brooklyn Museum, a commodious structure on Eastern Parkway, near the entrance to Prospect Park, is devoted to fine arts, ethnology, and natural history.

**Brooks, James** (1810-73), American journalist, formed a connection with the *Portland Advertiser*, and acted as its correspondent in Washington and in the South, his letters setting a new standard for newspaper correspondence. Some of his newspaper correspondence was later published as *A Seven Months' Run, Up and Down and Around the World* (1872).

**Brooks, Maria**, known as 'Maria del Occidente' (c. 1795-1845), American poet, best known for *Zophiel, or the Bride of Seven*, which appeared in London in 1833, under the supervision of Robert Southey.

**Brooks, Noah** (1830-1903), American author and journalist, was a favorite writer for boys. Among his books are *Abraham Lincoln and the Downfall of American Slavery* (1894).

**Brooks, Phillips** (1835-93), American divine and author, was born in Boston, of Puritan descent. In 1862 he became rector of the Church of the Holy Trinity in Philadelphia, where he remained until his acceptance of the rectorship of Trinity Church, Boston, in 1869. Dr. Brooks obtained a considerable reputation as a preacher before leaving Philadelphia, his eloquence being enhanced by his lofty stature and impressive personality. At Boston after his consecration as fifth bishop of the Protestant Episcopal Church in Massachusetts, he was a dominating force in all matters relating to the social, intellectual, and religious improvement of his city and State. Among Dr. Brook's numerous works are *Yale Lectures on Preaching* (1877), *The Influence of Jesus* (1879), *Sermons Preached in English Churches* (1882), and *Literature and Life* (1886). He wrote several Christmas and Easter carols, of which a favorite is that entitled 'O Little Town of Bethlehem!'

**Brooks, Van Wyck** (1886-), Am. critic, born Plainfield, N. J. Works: *America's Coming of Age*, 1915; *The Ordeal of Mark Twain*, 1920; *The Pilgrimage of Henry James*, 1925; *Emerson*, 1933; *The Flowering of New England*, 1936; *New England: Indian Summer*, 1940; *The Confident Years*, 1952.

**Brooks, William Keith** (1848-1908), American zoölogist, born in Cleveland, O. He was professor of zoölogy at Johns Hopkins University, where he organized the Ches-

apeake zoölogical laboratory. Prof. Brooks took a large part in the artificial development of the American oyster. Among his extensive scientific writings are *Handbook of Invertebrate Zoölogy* (1882), and *The Foundations of Zoölogy* (1898).

**Brooks, William Robert** (1844-1921), American astronomer, born in Maidstone, England. He made a new record in the matter of discovering comets, announcing twenty-four by 1906, making an unprecedented total for any one observer up to his time. Some of these discoveries were made possible by his own inventions in photography. He became professor of astronomy at Hobart College, and member of learned societies. American and foreign.

**Brookweed** (*Samolus Valerandi*), a small, herbaceous plant, belonging to the Primulaceæ. It abounds in marshes near the sea. Small white flowers are borne in racemes on a slender stem springing from the centre of a rosette of bright green leaves.



Broom: 1, Stamens and pistil; 2, pod.

**Broom.** The common broom (*Sarthothamnus scoparius*, *Cytisus scoparius*) is an evergreen shrub about three ft. or more in height, with numerous straight twigg branches, small ternate leaves, and large yellow papili-

onaceous flowers, followed by dark-brown pods. It thrives everywhere in dry sandy soil, no matter how poor it be. The *Planta genista*, which gave its name to the line of Plantagenet, was the broom. *C. canariensis* and *C. racemosus* are specially worth growing as greenhouse plants, being the yellow-flowered 'genistas' sold by florists. See Hulme's *Wild Fruits of the Countryside* (1902).

**Broom.** See **Brushes.**

**Broom Corn** (*Sorghum* [Andropogon] *vulgaris*), an E. Indian reedlike grass cultivated in the United States, and used for making brooms; the seeds afford a food for cattle.

**Broom Rape** (*Orobanchæ*), about 180 species, belonging chiefly to the temperate regions, all parasitic on the roots of other plants. They are brightly-colored plants, but bear no green leaves, having scales instead. The naked broom rape of America is *Thaleisia uniflora*, a delicate, leafless plant, sending up groups of gray, pubescent peduncles, bearing lilac-tinted flowers.

**Brothel**, a house of prostitution; also known as a bawdy-house or disorderly house. Such a house is a common nuisance at the common law and may be abated by the public authorities on information of any private person, as an infringement of public order and decency, and the keeping of such a house is a misdemeanor.

**Brotherhoods**, associations of men of the same profession, society, fraternity, or religious order. The chief earlier religious brotherhoods of the Roman Catholic Church were the fraternities known as the Brothers of Mary, of the Scapular, of the Rosary, of the Sacred Heart, and of Francis Xavier. These were followed by the Fratres Pontifices (whose duties were mainly confined to looking after travellers in the neighborhood of bridges and ferries), and the Familiars and Cross-bearers, identified with the Spanish Inquisition. During the last two centuries there has been a large growth of brotherhoods (generally called confraternities) in connection with the Roman Catholic Church. There are also several brotherhoods in connection with the Church of England.

**Brothers, Richard** (1757-1824), a British naval officer, born in Newfoundland. About 1793 he began to describe himself as the 'nephew of the Almighty,' prophesied his own 'revelation,' on Nov. 19, 1795, as prince of the Hebrews and ruler of the world, and the rebuilding of Jerusalem in 1798. In 1806 Brothers was taken charge of by John Fin-

layson, a Scottish writer, who had given up a lucrative practice at the bar to follow him. In 1794 he published a book of 'prophecy,' *A Revealed Knowledge of the Prophecies and the Times*, which led many to believe in him.

**Brough, Lionel** (1836-1909), English actor, born at Pontypool, Monmouthshire. He visited the U. S. at different times, where he won popularity by his portrayal of comic rôles, among them Paul Pry, and Tony Lumpkin in *She Stoops to Conquer*.

**Brougham, Henry, Baron Brougham and Vaux** (1778-1868), English statesman, scholar, and scientist, was born in Edinburgh. In 1802 he joined with Jeffrey and others in founding the *Edinburgh Review*. To the first twenty numbers he contributed no fewer than eighty articles; and the encyclopædic character of his learning, which included natural philosophy and mathematics, natural theology and metaphysics, besides politics and history, was displayed in these early contributions.

At the English bar he contrived to make a great reputation by his success in some celebrated cases. Brougham was a tireless advocate of slave emancipation, of political reform, of law reform, of national education, and of religious equality. His writings were published in 11 vols. in 1855-61. *His Memoirs of His Life and Times* are hardly trustworthy. Consult Bagehot's *English Constitution*.

**Brougham, John** (1814-80), Irish-American dramatist and actor, was born in Dublin. For a time he was manager of Niblo's Garden; in 1850 opened Brougham's Lyceum, which was afterward Wallack's Theatre; then attempted the management of the Old Bowery Theatre—all in New York. As an actor he excelled in Irish parts. He wrote over seventy plays, among the best known being *The Duke's Motto*, *Bel Demonio*, *Romance and Reality*, and the burlesque *Pocahontas*.

**Broun, Heywood Campbell** (1888-1939), American columnist and critic; educated at Harvard University; with *N. Y. Tribune* (1913-21); *N. Y. World* (1921-28); Scripps-Howard newspapers from 1928. He organized American Newspaper Guild; was president of Guild (1933-39). He wrote *A.E.F.* (1918); *Sitting on the World* (1924).

**Broussais, François Joseph Victor** (1772-1838). French physician, was born in St. Malo. He founded a peculiar theory of medicine—*Histoire des Phlegmasies ou Inflammations Chroniques* (1808), and *Examen de la Doctrine Médicale généralement adoptée*

(1816)—in which he defined life as dependent upon irritation, and disease, primarily local in its origin, as excessive or insufficient irritation.

**Brousseau, Claude** (1647-98), French Huguenot leader and preacher, was born in Nîmes. He became a lawyer and the legal defender of the Huguenot poor, as well as a leader in their meetings to protest against persecutions. His house in Toulouse was the meeting place of the Huguenot assembly that drew up the famous 'Project' (1683) to hold services simultaneously throughout the country on the ruins of the Protestant meeting houses. In 1698 he was arrested at Oloron, tried, and broken on the wheel. Consult Nègre's *Vie et Ministère de Claude Brousseau*, which contains many of his writings.

**Brouwer, or Brauer, Adrian** (?1606-38), Dutch painter, was born of humble parentage at Oudenarde. He studied at Haarlem (1626-7) under Frans Hals, a hard taskmaster, from whose cruelties he fled to Amsterdam, and thence to Antwerp. A life of dissipation brought him to an early death. His subjects, like those of his countryman Teniers, were chosen from low life—tavern brawls, country feasts, boors playing cards, etc.—but are all executed with admirable expression, brilliant coloring, and exquisite finish and vigor. Consult Bode's *Life*.

**Brown, Alice** (1857-1948), American author, was born in Hampton Falls, N. H.; she was the author of stories of New England life. She wrote *Margaret Warrener* (1901); *High Noon* (1906); *The Story of Thyrza* (1909); *Children of Earth* (1915), a prize-play; *Bromley Neighborhood* (1917); *Jeremy Hamlin* (1934); *Pilgrim's Progress* (1944).

**Brown, Charles Brockden** (1771-1810), the first prominent American novelist. The novel became his medium of expression for the moral and psychological ideas in which he was primarily interested. *Wieland* (1798) was followed by *Ormond*, *Arthur Mervyn*, and *Edgar Huntley* (1799)—the last-named being the first important story of Indian life; *Clara Howard* (1801), and *Jane Talbot* (1804). His books were popular, but not profitable, and he was forced to rely on his parents for support. His novels are characterized by lively diction, varied and plentiful incident, which is, however, full of improbabilities and of actions without adequate motive. Brown followed the English Gothic school of horrors and mysteries, with only the change from mediæval to American backgrounds. He is said to have had considerable

influence on Hawthorne through his preoccupation with moral problems. Consult Quinn, A. H., *American Fiction*; an *Historical and Critical Survey* (1936); Snell, G. D., *The Shapers of American Fiction, 1798-1947* (1947).

**Brown, Elmer Ellsworth** (1861-1934). American educator, was born in Kiantone, N. Y. In July, 1906, he became United States commissioner of education, and in July, 1911, Chancellor of New York University. On July 1, 1933, he became Chancellor-Emeritus. He has written *Making of Our Middle Schools* (1903); *Origin of American State Universities* (1905); *Government by Influence* (1909).

**Brown, Ernest William** (1866-1938), American mathematician and educator, was born in Hull, England. He was professor of mathematics at Haverford College from 1891 to 1907, and has held the same chair at Yale University since 1907. Besides many papers on lunar theory and celestial mechanics, he has written *Treatise on the Lunar Theory* (1896); *New Theory of the Moon's Motion* (1897-1908); *Inequalities in the Motion of the Moon Due to the Direct Action of the Planets* (1908, Adams Prize Essay).

**Brown, Ford Madox** (1821-93), British historical painter, and pioneer of the pre-Raphaelite movement, was educated in Belgium. His true teachers were Holbein and the 15th century Italian masters, from whom he developed his sense of grand style and archaism of form. Among his masterpieces are *Christ Washing St. Peter's Feet* (National Gallery, London); *Last of England*; *Work*; *King René's Honeymoon*; *King Lear*; *Cordeia's Portion*; *Cromwell at St. Ives*. Consult Johnson, Charles, *Eng. Painting from the Seventh Cent. to the Present Day* (1932).

**Brown, Francis** (1849-1916), American theologian and educator, was born in Hanover, N. H. In 1908 he became president of Union Theological Seminary. Among his books are *Assyriology—Its Use and Abuse in Old-Testament Study* (1885); *The Christian Point of View*, with Profs. Knox and McGillert (1902).

**Brown, George** (1818-80), Canadian journalist, the son of a well-known newspaper man, was born in Edinburgh, Scotland. He established the *Toronto Globe* (1844), which was at first published as a weekly. He also took an active part in politics for many years, entering Parliament in 1852, and being a consistent advocate of reform in Canadian matters.

**Brown, George Loring** (1814-89), Amer-

ican landscape painter, was born in Boston, Mass. His subjects are mainly American and Italian landscapes, among them being *Niagara by Moonlight*; *Doge's Palace and Grand Canal*.

**Brown, Goold** (1791-1857), American grammarian, was born in Providence, R. I., of Quaker descent. His *Institutes of English Grammar* (1823) was followed by *First Lines of English Grammar* (1823). In 1851 he published *A Grammar of English Grammars*, a monumental work, covering almost every conceivable point of the subject of which it treats.

**Brown, Harvey** (1796-1874), American soldier, was born in Rahway, N. J. After the outbreak of the Civil War he held Fort Pickens against a Confederate attack (Nov. 22-23, 1861), and in 1866 was made major-general for distinguished services in the suppression of the riots in New York City. He retired from active service in 1863.

**Brown, Henry Kirke** (1814-86), American sculptor, was born in Leyden, Mass. His chief work was the equestrian statue of *Washington* in New York City, which is notable as the first important piece of bronze statuary cast in the United States.

**Brown, John** (1800-59), American abolitionist, was born in Torrington, Conn. He early conceived a hatred of slavery, and in 1834 planned a school for negroes, hoping to bring about emancipation by education.

In 1849 he settled on a farm in Mount Elba, N. Y., where Gerrit Smith had established a negro colony, and here he entered with enthusiasm upon the work of helping his colored neighbors. In the early fifties, the Virginia plan which caused his death was formed, the scene of which was laid at Harper's Ferry, and was brought to a head in 1859. The plan was to seize, with the help of an armed force, a strong position in the mountains, whence slave-liberating forays could be made into the surrounding country, and slaveholding made insecure. John Brown has been and perhaps always will be the subject of controversy. To Emerson and Thoreau, he was a saint and hero. Later writers, knowing the facts, laud him as a martyr, while others denounce him as a desperado, a ruffian, and a criminal. The truth, as usual, seems to lie between the two extremes. He appeals to the imagination by his fervor of conviction, and commands respect by his singleness of purpose. Consult Du Bois' *John Brown* (1909); Benét's *John Brown's Body* (1928); Villard's *John Brown* (1943).

**Brown, John** (1735-88), Scottish physician, was born at Buncle, Berwickshire. His doctrines, known as the Brunonian system, now medical commonplaces, were promulgated in *Elementa Medicinæ* 1780, which consisted chiefly in an attack on the indiscriminate use of blood-letting.

**Brown, John** (1736-1803), American merchant, was born in Providence, R. I. Like his father, James Brown, he became a successful merchant, the first Rhode Islander to trade in the East Indies. He laid the cornerstone of the first building of Rhode Island College, now Brown University, of which he was a benefactor, and the treasurer for 20 years.

**Brown, John** (1810-82), Scottish author and physician, was born in Biggar, Lanarkshire. He has been called the Charles Lamb of Scottish literature. His writings, collected into the three volumes of *Horæ Subsecivæ* (1858-61), are among the most charming in the language. The most popular and the finest of his productions is *Rab and His Friends* (1859).

**Brown, Nicholas** (1769-1841), American merchant and philanthropist, nephew of John Brown (1736-1803), was born in Providence, R. I. A liberal benefactor of his alma mater, its name was changed to Brown University in his honor. He also gave liberally to other institutions. Consult Hunt's *American Merchants*.

**Brown, Robert**, founder of the Brownists. See **Brownie**.

**Brown, Robert** (1773-1858), Scottish botanist, was born in Montrose. He published the results of his researches in *Prodromus Floræ Novæ Hollandiæ* (1810), the first British work on botany which treated of plant arrangement in a truly philosophical spirit. In the same year he discovered 'Brownian movements.' In 1839 he was awarded the Copley medal of the Royal Society.

**Brown, Samuel Robbins** (1810-80), American missionary, was born in Connecticut. He went as a missionary to China in 1838, and founded the Morrison Chinese School for boys at Canton, the first Protestant school in China, remaining at its head until 1847.

**Brown, Sir William** (1784-1864), British merchant and banker, was born in Ballymena, Ireland. When he was sixteen he went to the United States, where he started his commercial career in the linen trade in Baltimore. In 1809 he returned to England, and established a branch of his firm at Liverpool.

becoming at the same time, a general merchant, and subsequently a banker, founder of the firm Brown, Shipley and Company.

**Brown Bess**, the English soldiers' name for the regulation bronzed flintlock musket formerly used in the British army.

**Brown Coal**, or **Lignite**, a variety of coal. See **LIGNITE**; **COAL**.

**Browne, Charles Farrar** (1834-67), better known as **ARTEMUS WARD**, American humorist and lecturer, was born in Waterford, Me. At first a compositor, and then a reporter and contributor to various newspapers, in 1858 he began to write in the *Cleveland Plain Dealer*, under the title of 'Artemus Ward, showman.' His droll contributions, with their mixture of quaint spelling, keen wit, and shrewd common sense soon came to be widely read. Many of his sketches were published in 3 volumes, but were subsequently collected into a single volume, entitled *The Complete Works of Artemus Ward*, with a biographical sketch by Melville D. Landon (1875).

**Browne, Edward Ganville** (1862-1926), English Oriental scholar and lecturer, was born in Newcastle-on-Tyne. He studied medicine and science, but after a course of travel in Persia he abandoned the practice of science for the cultivation of Oriental languages. In 1888 he was appointed lecturer in Persian at Cambridge and in 1902-26 he was Sir Thomas Adams professor of Arabic. He published many valuable treatises.

**Browne, Hablot Knight** (1815-82), English book illustrator, caricaturist and water-color painter, known as 'Phiz,' was born in Surrey. In 1836 he was chosen by Dickens to illustrate the *Pickwick Papers*, then being published.

**Browne, Junius Henri** (1833-1902), American journalist, was born in Seneca Falls, N. Y. At the outbreak of the Civil War he became war correspondent of the *New York Tribune*. After the war he was occupied as journalist and author, in New York City.

**Browne, Robert** (?1550-1633), English clergyman, founder of the religious sect of the 'Brownists,' was born in Toilethorpe, Rutlandshire. Consult John Browne's *History of Congregationalism in Norfolk and Suffolk*; *Dexter's Congregationalism of the Last Three Hundred Years*.

**Browne, Sir Thomas** (1605-82), English physician, antiquary, and author of *Religio Medici*, was born in London. The *Religio Medici* ('Religion of a Physician') was writ-

ten about 1634 for his own pleasure; but an edition having been published without his sanction in 1642, the next year he published an authorized edition, which was most successful. There was a notable edition of Browne's works by Simon Wilkin (4 vols. 1835-36); a recent one by Charles Sayle (3 vols. 1904-1907).

**Browne, William** (1591-?1643), English pastoral poet, was born in Tavistock. His great work is *Britannia's Pastorals* (books i., ii., 1613-16; reprinted 1625). A third book was printed by the Percy Society in 1852, and by W. C. Hazlitt in his collective edition of Browne's works for the Roxburghe Club (2 vols. 1868); which includes also *The Shepherd's Pipe* (1614), a collection of eclogues, a masque produced at the Inner Temple in 1615, sonnets, and 'visions' on the model of Du Bellay. Browne was an admirer and imitator of Spenser. Ben Jonson, Michael Drayton, and Selden were numbered among his friends.

**Brownell, William Crary** (1851-1928), American author and critic, was born in New York City. After several years of travel and study abroad, he joined the N. Y. publishing house of Charles Scribner's Sons as literary adviser in 1888. His latest book is *Democratic Distinction in America*, published in 1928.

**Brownhills**, vil., Staffordshire, England, which has extensive coal mines; p. 18,200.

**Brownian Movements**, or **Motions**, are rapid vibratory motions observed in microscopic particles, both vegetable and mineral, when suspended in water, and first noticed by the botanist Robert Brown in 1827.

**Brownie**, a term in Scottish tradition signifying 'little brown one,' and applied to a race chiefly remembered as occupying a servile position in houses and on farms. See **GNOME**, **DWARFS**.

**Browning, Elizabeth Barrett** (1806-61), English poet, was born at Coxhoe. From an early age an invalid—largely due to an accident to her spine—her health gave chronic anxiety. She was (against her father's wish), married, in London, to Robert Browning, Sept. 12, 1846; and after the birth of their son, in Florence, early in 1849, she gained a fresh lease of life. For many years the Brownings lived in Florence, with intervals of residence in London and Paris, and latterly at Rome; and it was in her loved Florence, the city of her *Casa Guidi*, that, on June 29, 1861, she died. It is often said that the most popular work of Elizabeth Barrett Browning was

—even that it still is—*Aurora Leigh. Sonnets from the Portuguese*, is the highest and finest expression in English or any other literature, of a woman's love for a man; the lasting monument of England's greatest woman poet.



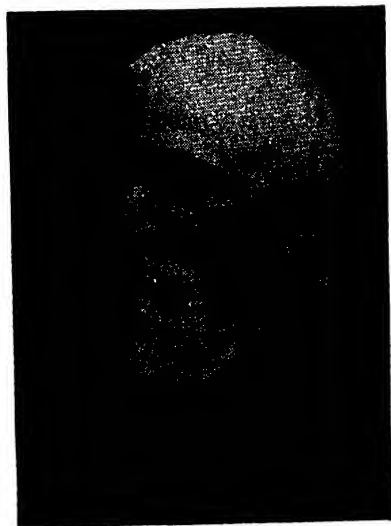
*Elizabeth Barrett Browning.*

Among her other works are the *Dead Pan* and *The Cry of the Children*; *Selected Poems*, edited by Robert Browning; collected works—2 vols., New York, 1871; 5 vols., London 1890. Consult *Letters of Robert Browning and Elizabeth Barrett*. 2 vols. (1899); *Complete Poetical Works* (1900); Winwar, Frances, *Elizabeth Barrett and Robert Browning; a Biography* (1950); Hewlett, Dorothy, *Elizabeth Barrett Browning; a Life* (1952).

**Browning, Oscar** (1837-1923), English lecturer in history, was born in London. He was a leading exponent of the training of teachers. A few of his chief works are: *A History of the Modern World, 1815-1910* (London, 1912); *A History of Medieval Italy, 568-1530* (1914); *Memories of Later Years* (1923).

**Browning, Robert** (1812-89), by many held to be the greatest English dramatic poet since Shakespeare, and almost universally admitted to be one of the two greatest poets of the long and brilliant Victorian era, was born at Camberwell (then an outlying suburb of London), May 7, 1812. Browning had

a happy childhood in a prosperous and well-ordered household, and enjoyed the careful training of affectionate and cultured parents. From boyhood he showed exceptional intellectual and literary tendencies, and when he was no more than twelve years old his father printed for him his poetic 'first-fruits,' under the title *Incondita*. He never went to a public school, nor to one of the great universities; though when his education by a private tutor was finished, he attended, during the session of 1829-30, a course of lectures at University College, London. The most important educational event in the youth of Browning was his sojourn, in his twenty-second year (1833-4), in Russia and Italy. His first publicly printed poems appeared (above the signature of 'L') in the *Monthly Repository* (1834). His earliest dramatic effort, *Strafford*, was produced by Macready at Covent Garden, London, on May 1, 1837. Even Tennyson declared *Sordello* (1840) difficult to understand. The publication, during 1841-6, of the remarkable series of dramatic and lyrical poems, in eight parts, collectively grouped under the title *Bells and Pomegranates*, was followed by his marriage, Sept. 12, 1846, to Elizabeth Barrett (see BROWNING, E. B.), already a poet far more widely known



*Robert Browning.*

than himself. Their union was an ideal one, and in March, 1849, a son was born to them in Florence, where they had settled in the winter of 1847, and which, with several breaks



of varying intervals, remained their home till the summer of 1861, when Mrs. Browning died. Following this event, Browning resided in London, though with frequent and often prolonged visits to Italy. In November of 1889, he joined his son at his former home in Venice, where he died on December 12. On the last day of 1889 his body was placed in the Poets' Corner, Westminster Abbey.

The greatness of Robert Browning as a poet is beyond dispute. The spiritual secret of his mastery is revealed in his words spoken of Shelley: 'I prefer to look for the highest, not simply the high.' Great as has been his moulding influence on the character and mind of a vast number of readers—to whom perhaps, in the main, the ethics of his poetry is of more import than its verbal beauty—he has also nobly enriched our literature with verse of enduring beauty for its own sake. Among many masterpieces—from *Pippa Passes* to the *Asolando* of his old age; from the superb verse of *Paracelsus* to the last 'flute-note with an accompaniment'—we may discern the figure of one who, beyond all cavil, is a great poet. His many works include:—*Incondita* (privately printed, 1824); *Pauline* (1833); *Paracelsus* (1835); *Stafford* (1837); *Sordello* (1840); *Bells and Pomegranates* (1841-6) in eight parts; *Christmas Eve and Easter Day* (1850); *Men and Women* (2 vols. 1855); *Dramatis Personæ* (1864); *The Ring and the Book* (4 vols. 1868-69); *Dramatic Idylls* (2 ser. 1879-80); *Asolando* (1889-90.)

Besides his original writings, Browning published a translation of the *Agamemnon* of Æschylus (1877). He also edited the forged *Letters of Shelley* (1852), *Selections from Mrs. Browning's Poems* (1866 and 1880), Mrs. Browning's *Poetical Works* (1889-90), and (in 1884) Rev. T. Jones' *The Divine Order*. Consult *Letters of Robert Browning and Elizabeth Barrett*. 2 vols (1899); Orr, A. L., *The Life and Letters of Robert Browning* (new ed. 1908); Burdett Osbert, *The Brownings* (1929); Phelps, W. L., *Robert Browning* (new ed. 1932); Griffin, W. H., *Life of Robert Browning* (3rd ed 1938); *New Letters of Robert Browning* (1950); Browning, Robert, *Poetry and Prose*, ed. by Simon Nowell-Smith (1951); Miller, B. B. S., *Robert Browning; a Portrait* (1953).

**Brownists.** See **Browne, Robert**.

**Brownlow, William Gannaway** (1805-77), American journalist, was born in Wythe co., Va. In 1838 he became editor of the *Knoxville, Tenn., Whig*, which he conducted

so aggressively as to be known as 'the fighting parson.' He was an advocate of slavery, but was opposed to secession and for this reason his paper was suppressed by the Confederate authorities in 1861. His publications include a book describing his ante-bellum experience and several brochures.

**Brown-Sequard, Charles Edward** (1817-94), physician and physiologist, was born in Mauritius, his father being a native of Philadelphia, and his mother French. He devoted himself to physiological investigations, making numerous discoveries in the composition of the blood, animal heat, the spinal column and its maladies, the muscular system, and especially the nervous system. In addition to many essays and memoirs, he published *Lectures on Physiology and Pathology of the Nervous System* (1860) and *Lectures on the Diagnosis and Treatment of Paralysis of the Lower Extremities* (1861).

**Brownson, Orestes Augustus** (1803-76), American author and theologian, was born in Stockbridge, Vt. He was a clear and vigorous writer, sincere in his beliefs in spite of frequent changes. His works include *Charles Elwood, or the Infidel Converted* (1840); *The Spirit-rapper: an Autobiography* (1854); *The Convert, or Leaves from my Experience* (1857); *The American Republic; Its Constitution, Tendencies, and Destiny* (1870).

**Brown Spar**, in mineralogy, a term applied to any light carbonate of lime, tinged by, or combined with, oxide of iron, such as ankerite, dolomite, magnesite, or siderite.

**Browntail Moth**, a European moth (*Euproctis Chrysorrhæa*) whose larvæ are destructive to trees. The adult female is pure white except the tip of the abdomen which is brown. The microscopic hairs on its body are often exceedingly poisonous to some people, producing a dermatitis similar to that caused by poison ivy. Cutting and burning of the winter webs before the caterpillars emerge in April, and spraying with arsenate of lead in midsummer, are both effective means of control.

**Brown University**, an institution of higher learning in Providence, R. I., chartered in 1764. In 1765 the college, originally called Rhode Island College, was opened at Warren, where the first president, James Manning, had established a Latin school, but in 1770 removed to its present site in Providence. The Women's College, Pembroke, founded 1891, became part of Brown in 1897. It has its own dean, campus and buildings and is related to the university only through a com-

mon board of trustees and a teaching staff.

**Bruce, Blanche Kelso** (1841-98), negro public official, was born a slave, of African descent, in Prince Edward co., Va. He was register of the U. S. treasury, 1881-5, and 1897-8, and in 1890 was appointed recorder of deeds for the District of Columbia.

**Bruce, David** (1324-71), Scottish king, son of Robert Bruce, whom he succeeded in 1329, when a mere child. He was taken prisoner in 1346 and confined in the Tower of London, whence he was removed to Odiham, where he remained until 1357. He had no descendants and his later years were marked by various intrigues with England regarding his successor to the throne. Consult Dunbar's *Scottish Kings*.

**Bruce, James** (1730-94), Scottish traveler, was born in Kinnaird, Stirlingshire. In 1765 set forth on an archæological tour through Barbary. In 1768 he undertook a journey to Abyssinia, and in November, 1770, found the sources of the Bahrel-Azrek, or Blue Nile, which was considered the main stream of the Nile. Returning to Scotland, he prepared for publication his *Travels to Discover the Sources of the Nile*, which appeared in 1790. Consult Murray's book, *The Life of James Bruce*.

**Bruce, Robert** (1274-1329), king of Scotland, belonged to the Norman family De Bruis, which, in the person of Robert de Bruis, came to England with William the Conqueror in 1066. This knight received large grants of land, chiefly in Yorkshire; and his son Robert, who was an associate of the prince who afterwards became David I. of Scotland, obtained the lordship of Annandale. At the battle of the Standard, (1138), Robert Bruce, who had received the original grant of Annandale, fought on the English side; while his son, the third Robert, fought under David, and was taken prisoner, it is said, by his own father. The fifth lord of Annandale, Robert de Bruis, (1210-95), was a competitor with John Baliol for the crown of Scotland in 1290, claiming the honor as a son of the second daughter of David I. But in 1292 Edward I. awarded the crown to Baliol; and Bruce, to avoid recognition of his rival's claims, resigned to his son, Robert de Bruis (d. 1304), his Scottish lordship of Annandale. This sixth lord fought on the English side when Baliol was forced to throw off the English yoke. He claimed the throne which Baliol relinquished; but Edward refused, and the claims of the house of Bruce were inherited by his son, the greatest of the

family, ROBERT BRUCE, who at first followed the family policy. The year 1306, which saw him finally break with Edward I., was the beginning of the salvation of Scotland. What the circumstances were which led him at Dumfries to murder Comyn, a nephew of Baliol, and a rival for the Scottish crown, are not clearly known; but from 1306 Bruce faced the difficulties of his situation, and gradually won, by his ability and his success, the esteem and confidence of the people of Scotland, who had known many years of Edward's 'resolute' government.

The ultimate success of Scotland resulted from his policy of carrying on offensive war against England in the northern counties and in Ireland. Robert Bruce was as wise a king in peace as he was brave and skilful in war, and his policy was directed to the restoration of Scottish prosperity, and to the safeguarding of the land against English aggression. He encouraged the burghs, and first gave them a place in the Scottish Estates (Cambuskeneth, 1326); and he had the power to carry out as well as the wisdom to devise. He died at Cardross of leprosy in 1329, and was succeeded by his infant son David II.

**Brucea**, a genus of Simarubaceæ, named in honor of the Abyssinian traveller, J. Bruce. The species are natives of Abyssinia, China, etc., and some of them possess properties similar to quassia, the seeds of *B. sumatrana* being used locally as a remedy for dysentery.

**Bruch, Max** (1838-1920), German composer and conductor, was born at Cologne. In 1883 he visited the U. S. where, at Boston, he conducted his oratorio *Arminius*. This one of his compositions is extremely popular in the U. S. He has written two operas—*Lorelei* (1863) and *Hermione* (1872)—music for Schiller's *Jungfrau von Orleans*, and many religious and secular pieces, including violin concertos and symphonies.

**Brucine**, or **Dimethoxy-Strychnine** ( $C_{22}H_{26}N_2O_4$ ), is an alkaloid present in nuxvomica and St. Ignatius's bean. It is a colorless crystalline solid, with a very bitter taste and similar properties to strychnine.

**Brucite**, a magnesian mineral associated with the serpentines. It is soft, flaky mineral with pearly lustre and composition  $MgO \cdot H_2O$ . The fibrous variety is called Nematite. It is abundant in the serpentines of Hoboken, N. J., from which locality it was first described in 1814—named after Col. Bruce.

**Brückner, Alexander** (1834-96), Russian historian of German descent, born in St. Petersburg. Was professor of history at the

law school in St. Petersburg from 1861-7, and in 1872 was appointed professor of Russian history at the University of Dorpat, but lost the appointment when the university was Russified in 1891.

**Bruckner, Anton** (1824-96), Austrian organist and musical composer, was born at Ansfelden, Upper Austria. He has written nine symphonies showing an ultra-Wagnerian tendency.

**Bruening, Heinrich** (1885- ), Chancellor of Germany from 1930 to 1932. A government clerk who became a member of the Reichstag and rose with phenomenal rapidity. With the support of President von Hindenburg he endeavored unsuccessfully to crush the National Socialist movement, and in 1932, after failing to win its support in the Reichstag, he was dismissed by the President and succeeded by Franz von Papen. He came to the United States and in 1937 became a lecturer at Harvard University.

**Bruges** (Flem. *Brügge*), tn. and episc. see of Belgium, chief tn. of W. Flanders. From the 12th to the 16th century Bruges was the largest commercial city in the north of Europe, a centre for the English and Scandinavian trade as well as the emporium of Hanseatic and Venetian and other Italian mer-

stroyed by the French in 1799—is of all periods between the 12th and the 19th century. The most valuable pictures in Bruges are the small collection of Memlinc's paintings in the hospital of St. John. The famous belfry of Bruges, 353 ft. high, was built between the 13th and the 15th century but equipped with its present carillon only in 1743. The museum and picture gallery, with valuable Flemish pictures; the museum of antiquities in the Gruuthuuse a 15th-century structure; the 14th-century (Poorters Loge) archives, are included in the public buildings.

**Brugsch, Heinrich Karl** (1827-94), German Egyptologist, was born at Berlin. He was sent by the Prussian government to Egypt in 1853, where he joined Mariette in the Memphis excavations. In 1879 he became head of the Khedive's school of Egyptology at Cairo. On grounds of economy he was dismissed from his post in 1879.

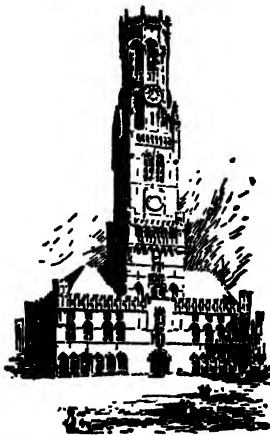
**Bruises** are the result of laceration of subcutaneous tissues, the skin itself being unbroken. They commonly result from direct violence, such as a blow with a blunt weapon, a crush, or a pinch, but are also produced by sudden, violent muscular efforts. In a bruise the discoloration is caused by hemorrhage from capillaries and other small blood-vessels, the changes in color arising from the different stages of blood disintegration and absorption. In the case of a bruise of the eyeball the discoloration is red, the blood keeping its arterial color.

**Brulov, or Bryloff, Constantin Pavlovich** (1799-1852), Russian painter, born at St. Petersburg. Between 1830 and 1833 he executed one of his greatest works, *The Destruction of Pompeii*, and in 1834 the *Death of Inez de Castro*. See Muther's *Hist. of Modern Painting* (1895-6).

**Brumaire**, the second month of the year in the French republican calendar, extended from October 22 to November 20.

**Brummell, George Bryan** (1778-1840), or BEAU BRUMMELL, English leader of fashion, was a friend of George IV. when prince regent. Brummell is remembered for his readiness in repartee and for his fastidious neatness in dress.

**Brunanburh**, a place in the n. of England, where Athelstan and his brother Eadmund, in 937, won a decisive victory over Anlaf of Dublin, Constantine of Scotland, the Celtic king of Northumberland, and the Northumbrian Danes, the battle practically establishing the unity of England for many years.



*The Belfry of Bruges.*

chants, and had at the height of its prosperity a population of 200,000. At the present time it is a quiet, quaint mediæval place, with a population of 51,667, traversed by canals, with small houses turning their gable ends towards the streets. The present cathedral, St. Salvator—the old cathedral was de-

**Bruck, Richard François Philippe** (1729-1803), one of the greatest classical scholars of the 18th century, was born at Strassburg. After serving in the Seven Years' War, he took up the study of Greek, and from 1776 devoted the greater part of his income to the issue of editions of the Greek authors, with emendations of the text.

**Brunel, British protectorate in N. W. Borneo**, between British N. Borneo and Sarawak. It was until 1888 an independent (Mohammedan) territory, and its sultan was at one time overlord of the whole island. The population is estimated at about 46,000. The principal products are rubber, coal, sago and jelutong. Area 2,500 sq. m. Brunel, the capital is mostly built on piles; p. 10,619.

**Brunel, Isambard Kingdom** (1806-59), English civil engineer, born at Portsmouth, was the only son of Sir Marc Isambard Brunel. He entered his father's office in 1823. He assisted in the two great undertakings—his father's block machinery and the Thames Tunnel, 1825-43. He designed the *Great Western* steamship, which was the first to make regular voyages, 1838, across the Atlantic.

**Brunel, Sir Marc Isambard** (1769-1849), English engineer, was born at Hacqueville, France. Obligated to leave France in 1793 on account of his royalist opinions, he came to the U. S. and settled in New York as a civil engineer and architect. In 1799 he returned to England, and persuaded the Admiralty to accept his designs for making ship blocks by machinery. The invention was perfected in 1806. In 1824 the Duke of Wellington accepted his plan for the construction at London of a tunnel beneath the bed of the Thames. The work was completed in 1843.

**Brunelleschi, Filippo** (1377-1446), Italian architect and sculptor, was born at Florence. He promoted the restoration of the ancient classical style of architecture as a substitute for Gothic. His first great work was the church of San Lorenzo in Florence; and in 1418 he became architect of the unfinished cathedral of Florence, for which he designed the great dome, the largest in the world, imitated by Michael Angelo in the design for that of St. Peter's. See *Life* by Manetti (ed. Milanese, 1887); and Scott, *F. di ser Brunelleschi* (1901).

**Brunetière, Ferdinand** (1849-1906), was born at Toulon. He is generally acknowledged to be the most influential of recent French critics. After 1875 he contributed regularly to the *Revue des Deux Mondes*, of

which he was editor. His articles were collected from time to time in series, entitled *Etudes Critiques sur l'Histoire de la Littérature Française* (6 vols. 1880-98), *Questions de Critique* (2 vols. 1889-90), *Essais sur la Littérature Contemporaine* (2 vols. 1892-5), and *Histoire et Littérature* (3 vols. 1884-87). He confirmed his reputation and achieved considerable popularity by four series of lectures dealing respectively with *Evolution des Genres dans l'Histoire de la Littérature* (1890), *Epoques du Théâtre Français* (1892), *Evolution de la Poésie Lyrique en France au XIXe Siècle* (2 vols. 1893; 3rd ed. 1900-1), and *Bossuet* (unpublished). His work is characterized by wide and accurate knowledge, and it would be difficult to find his equal in tracing a tendency in literature, or in stating an author's relationship to his predecessors. He will be best remembered by his application of the theory of evolution to the study of literature.

A few of his later publications are: *Nouveaux Essais sur la Littérature Contemporaine* (1904); *Histoire de la Littérature Française Classique* (begun in 1905); *Sur les Chemins de la Croyance* (1905). Consult Matthews, B., *Study of the Drama* (1910); Babbitt, Irving, *Masters of Modern French Criticism* (1912).

**Brunhilda**, in the *Nibelungenlied*, queen of Iceland, wife of Gunther, who procured the murder by Hagen of Kriemhild's husband, Siegfried (see *NIBELUNGENLIED*). She is identified with one of the Valkyrie, in Norse mythology.

**Brunhilda**, a Visigoth princess, was married (567) to Sigbert, king of Austrasia, and became (596) regent for her two grandsons in the rule of half the Frankish kingdom; Fredegond ruling the other half for Clotaire II. On Fredegond's death (598) she became sole Merovingian queen, but was deposed and put to death in 613.

**Bruni, Leonardo** (1369-1444), Italian humanist and historian, was born in Arezzo. His *Historiarum Florentinarum Libri XII.* is a monument of research; while his *Commentarius Rerum suo Tempore Gestarum* and *Epistolæ Familiares* are full of interest for the history of the time. Though small in compass, the best known of Bruni's writings is the *Life* of Dante.

**Brünig Pass**, leads from the Swiss canton of Unterwalden and Lucerne to that of Berne.

**Brünn**, town and episcopal see, capital of Moravia, now Brno, one of the principal towns of Czecho-Slovakia. Brünn is a busy

industrial town. Woolen factories are the most important; and the manufacture of machinery, leather, gloves, hats, chemicals, sugar, starch, spirits, brewing, dyeing, flour milling, and brick making are conducted on a large scale; p. 273,127.

**Brunnen**, summer resort, Switzerland, on the lake of Lucerne.

**Brunner, Arnold William** (1857-1925), American architect, was born in New York City, and was educated at the College of the City of New York and the Massachusetts Institute of Technology. He designed Mount Sinai Hospital, Columbia School of Mines, City College Stadium, and Students' Hall, Barnard College, New York City; U. S. Post Office, Custom House, and Court House, Cleveland, O.; the new State Department Building, Washington, D. C. Author of *Interior Decoration* (1891).

**Brunner, Heinrich** (1840-1915), German lawyer and historian, was born in Wels, Upper Austria. His works on the history of German, Frank, Norman, and Anglo-Norman jurisprudence are of great value.

**Bruno, Giordano** (?1550-1600), Italian philosopher, was born at Nola, in the kingdom of Naples. He gave lectures on philosophy, and strongly attacked the Aristotelians.

His *Della Causa Principio ed Uno* (1584) and *Del Infinito Universo e Mondi* (1584) are his chief metaphysical works, and in these he develops a pantheistic system. His philosophy seems to have influenced Spinoza, Descartes, Schelling, and other thinkers.

**Bruno, St.** (c. 1040-1101), was born at Cologne, and became a canon of Rheims, and a director of the schools of the diocese. With six companions he retired to the desert near Grenoble, and founded there the Carthusian order (1084). (See **CARTHUSIANS**).

**Bruno The Great** (925-965), archbishop of Cologne, 953, was the son of Henry the Fowler and brother of Otho I. A celebrated scholar and statesman, he reconciled his brother and the French court, and is credited with the authorship of a commentary on the Pentateuch, and of a work on the lives of the saints.

**Brunswick** (German *Braunschweig*), a sovereign duchy of the former German Empire, embracing five small enclaves and three larger divisions, surrounded by the provinces of Hanover, Saxony, and Westphalia. Brunswick is now a state in the German Reich. The leading industries are agriculture, especially cattle grazing and fruit growing; there is much mining of lignite, iron and asphalt in

the Harz, and some manufacturing, chiefly sugar, sulphuric acid, beer, and spirits; p. 494,387.

**Brunswick, town**, capital of Brunswick, Germany. Chief industries include the manufacture of machinery, chemicals, paints, tobacco products, woolens, sugar and liquor; it was heavily bombed in 1944; p. 223,263.

**Brunswick, city**, Georgia, county seat of Glynn co. Industries include truck gardening, fishing, lumber mills, foundries, and machine shops, vegetable and oyster canneries, and box, carriage, and cigar factories; p. 17,954.

**Brunswick, town**, Cumberland co., Maine. It has large paper, pulp, and cotton mills. Other manufactures are flour, general hardware, canned goods, boxes, and wooden articles. Brunswick was settled in 1628 under the name of Pejepscot; p. 10,996.

**Brunswick Black**, a varnish composed of asphalt or pitch, linseed oil, and turpentine; used to give a glossy appearance to metal and other articles. *Berlin black* is a finer variety of the varnish.

**Brusa, Brussa, or Broussa**, town, Asiatic Turkey. It has important silk manufactures, and produces fruit and wine. Under the name of Prusa it was the capital of ancient Bithynia; p. 61,450.

**Brush, Charles Francis** (1849-1929), American inventor, was born in Euclid, O. He invented the Brush dynamoelectric machine, 1876, the 'series' electric arc lamp, 1878, and many electrical devices, chiefly for improving those two inventions.

**Brush, George de Forest** (1855-1941), American painter, born in Shelbyville, Tenn. His early paintings depicted Indian life, but he subsequently devoted himself to figure painting and portrait groups in the style of the Dutch and Flemish schools.

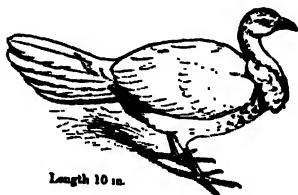
**Brushes**. In the making of brushes, a great variety of materials are employed. For coarse work, twigs of broom, birch, heather, and rushes are generally used, as well as rope, yarn, and the fibre of cane, coconut, and many other plants. Scratch brushes for cleaning metal surfaces are made of wire; brushes for working in acids, of spun glass. For artists' pencils sable is the best and dearest, but the hair from the camel, the ichneumon, and the cow's ear is much used. Varnishing brushes are made from bears' fur; while badgers' hair is used for graining and gilding. By far the greatest number of brushes are made from pigs' bristles. (See **BRISTLES**.)

Brushes may be divided into *simple* and

*compound*—the former consisting of one tuft, the latter of many. Bottle-brushes are made by fastening the bristles between two wires and allowing them to project on both sides. The wires are then twisted firmly together. In electro-technics, brushes are strips of copper or carbon rods which convey the current from the terminals of an electric motor to the commutator; or in the case of a dynamo, in the reverse direction. (See DYNAMO AND MOTOR.)

**Brush Turkey**, the popular name of *Cathartus lathami*, the largest of the megapodes. These birds are natives of Australia and the Pacific Islands. See MOUND BIRDS.

**Brussels** (French BRUXELLES), the capital of Belgium, in Brabant province, is one of the finest cities in Europe. It is divided by the Senne river into the Lower Town—the old section—and the Upper Town—the new



*Brush Turkey.*

quarter. The Upper Town contains the Royal Palace, the embassies, hotels, and fine residences; while the Lower Town is devoted chiefly to industry and commerce.

The Cathedral of St. Gudule, 1220-1539, overlooking the Lower Town, is renowned for its statues, painted glass, and carved pulpit. The Palace of Fine Arts, and the Museum of Modern Paintings are both extremely rich in works by the great Flemish masters.

The Conservatoire Royal de Musique (1876-7) contains a collection of rare musical instruments. The Picture Gallery is comparable in the richness of its collection to that of Antwerp. The massive Palais de Justice (1866-83), costing \$10,000,000, ranks first among the modern buildings. With its suburbs, it is the seat of important industries, especially the manufacture of lace, furniture, bronzes, woolen, fine cottons, leather goods, bricks, shoes, and cigarettes. It has a population of 1,308,831.

**History.**—Brussels is said to have been founded in the 6th century. In the 11th century it was chosen by the Duke of Lower

Burgundy as his capital, and in 1477 it became the capital of the Austrian Netherlands. In 1695 it suffered a bombardment by Marshal Villeroy. From 1697 to 1794 it was again under Austrian dominion. Between 1815 and 1830 it was, alternately with The Hague, capital of the Netherlands, and in 1830 it became the capital of the new kingdom of Belgium.

Early in World War I, on Aug. 20, 1914, the city was occupied by the Germans in their invasion of Belgium (see EUROPE, WORLD WAR I). The city was reoccupied by the Belgian army on Nov. 18, 1918. With the fall of Belgium in May, 1940, Brussels was taken by the Germans. It was retaken by the Allies Sept. 2, 1944.

Several international conferences have been held in Brussels. Here in 1874, there convened an important international conference on the laws and usages of war, generally known as the Brussels Conference. In 1876, Leopold, king of the Belgians, summoned to a conference at Brussels unofficial representatives of the Great Powers, in order to decide upon the best methods of the exploration and opening up of Africa to European trade and civilization. It resulted eventually in the creation of the Congo Free State. Consult Gilliat-Smith's *Story of Brussels* (revised edition).

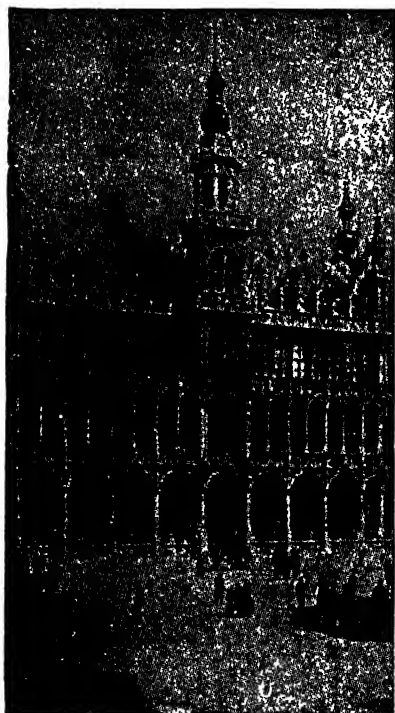
**Brussels Exposition**, an international exposition held in Brussels, Belgium, from April 23 to Nov. 7, 1910. Twenty-four foreign countries participated, the Belgian, French, German, British and Italian exhibits being the most extensive.

**Brussels Lace**, a lace of Brussels and its vicinity, famous since the 17th century. It was made in separate pieces, which were then woven together. The needlepoint (*point d'Aiguille*) was the most beautiful and expensive kind; the point d'Angleterre was made on pillows with bobbins. See LACE.

**Brussels Sprouts**, a cultivated form of *Brassica oleracea*, is distinguished from the cabbage in the growth of small heads (each of them a miniature cabbage) in the axils of the leaves for the whole length of the stem, the leaves being cut away as the buds develop.

**Brussels Sugar Convention.** In 1898 representatives of the powers met at Brussels to discuss measures for the abolition of bounties on sugar (see BOUNTY), but no plan was then agreed upon. In 1902 another conference was held, and a convention, to take effect Sept. 1, 1903, was concluded. By the

terms of this Convention all export bounties, direct and indirect, were abolished, and the excess of import duties over excise duties was limited to 53 cents per 100 pounds. The Convention was originally in force for five years from Sept. 1, 1903. It was renewed in 1907 and in 1912. The outbreak of World War I rendered the Convention ineffective.



*King's House, Brussels.*

**Brussels, University of**, an institution of learning in Brussels, Belgium, founded in 1834. It is an important centre of extension work and aids struggling students. It publishes *La Revue de l'Université de Bruxelles*.

**Brussiloff, Brussilov, or Brusiloff, Alexei Alexeivitch** (1856-1926), Russian general, was born in Kutais, Russian Caucasus. After the Russo-Turkish War, he was made adjutant to Colonel Sukhomlinoff, and later entered the Imperial Guards, rising successively to the command of a regiment, a brigade, a division, and the Fourteenth Army Corps stationed at Lublin.

In the first months of World War I, General Brussiloff co-operated with General Russky in driving back the Austrian forces

under General von Auffenberg. In April, 1916, he succeeded General Ivanoff in command of the forces from the Pripet Marshes to the Roumanian frontier. In June, 1917, he was appointed to succeed General Alexieff as commander-in-chief of all the Russian armies. He resigned from this position early in the following August, and later accepted the Bolshevik rule, and co-operated with the soviet government to the extent of serving on its military committees.

**Brut**, a chronicle in 32,000 verses, written by Layamon, recording the wanderings of Brut or Brutus, one of the heroes of Troy.

**Brütt, Ferdinand** (1849-dec.?), German historical and genre painter, was born in Hamburg. His early canvases deal with peasant life. After 1880 he made a specialty of town life, and has also painted portraits and religious pictures—*Christ Victorious* and *The Christ Night*.

**Brutium**, ancient name of the southern extremity or 'toe' of Italy. The sea coast was occupied by Greek colonies; the interior was held by the Brutii, who were subdued by Rome in 272 B.C. In the Second Punic War they helped Hannibal, and after its conclusion their territory was confiscated, and they were declared public slaves. See CALABRIA.

**Brutus**, a Roman family of the Junian clan, of which the most famous members were: LUCIUS JUNIUS BRUTUS, son of M. Junius and Tarquinia, sister of Tarquinius Superbus. When Tarquinius murdered his possible rivals, in order to make sure his own position as king, Lucius saved himself by pretending to be an idiot; hence his name Brutus, 'the imbecile.' After the outrage on Lucretia, Brutus vowed vengeance on the Tarquins, and roused the people to expel the King and his family. He became the first consul of Rome in 509 B.C., and executed his two sons, who were found guilty of a conspiracy to restore the Tarquins. He fell the same year, fighting against Aruns, son of Tarquinius.

MARCUS JUNIUS BRUTUS (85-42 B.C.), was a nephew of Marcus Cato. On the outbreak of the civil war in 49 he joined Pompey, and fought with distinction near Dyrrachium. In 42 he committed suicide because of defeat. Consult Plutarch's *Lives* and Cicero's *Letters*.

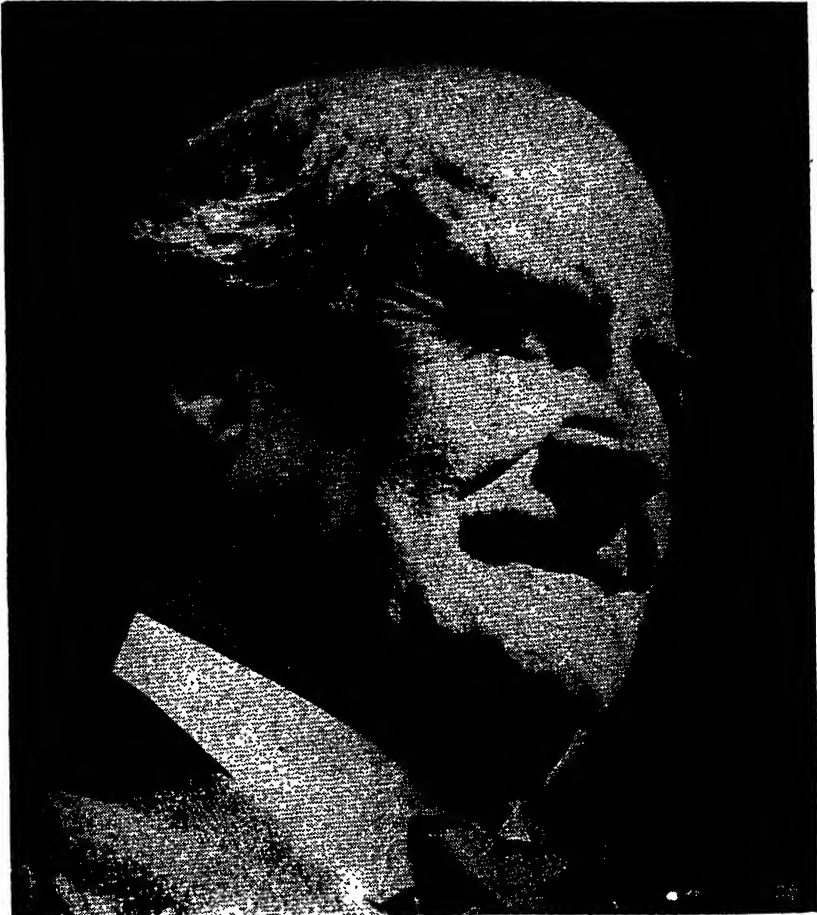
DECIMUS JUNIUS BRUTUS ALBINUS, another of the murderers of Cæsar, the hero of 'Et tu, Brute!' After the assassination, he headed the Republican Armies, seeking to frustrate the efforts of Antony to obtain su-

preme power. Defeated in Gaul, he sought to reach his associates in the East. On his way to Macedonia he was betrayed by a Gaulish chieftain to Antony, who had him put to death.

**Brüx**, (Czech. *Most*), town, Czechoslovakia. It is the center of rich coal fields, and has iron foundries and manufactures of sugar, agricultural machinery, and spirits; p. 27,-239.

**Bryan, Charles Page** (1856-1918), American diplomat, was born in Chicago, Ill. He served as minister plenipotentiary to China, (1897-8), and as ambassador to Japan, Aug., 1911-Nov., 1912. In 1913 he was decorated by the Emperor of Japan with the Grand Cordon of the Order of the Rising Sun.

**Bryan, William Jennings** (1860-1925), American public official, orator, and editor.



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*William Jennings Bryan.*

**Bry**, or **Brie**, **Théodore de** (1528-98), Belgian goldsmith, engraver, and painter, was born in Liège. With his sons, Jean Théodore and Jean Israël (*d.* 1611), he published several illustrated books of travel, the best known being *Collections Peregrinationum in Indian Orientalem et Occidentalem* (6 vols. 1590-9).

was born in Salem, Ill. In 1891-95 he was a member of Congress, and in 1894-96 editor of the *Omaha World-Herald*.

In 1896 he was a delegate to the National Democratic Convention at Chicago, in which he was a leader of the free-silver forces, and wrote the silver plank of the platform. His brilliant, impassioned speech, on this occa-



sion, contributed, it is believed, to his own unexpected nomination by the People's and National Silver Parties, and he conducted a notable campaign. In the ensuing election he was defeated by William McKinley. In 1900 he was again the Presidential candidate of the Democratic and Populist Parties, and of the Silver Republicans, and was again defeated by McKinley. In 1901 he established at Lincoln the weekly political journal, *The Commoner* (changed to a monthly in 1913), which he subsequently edited.

For the third time, in 1908, Bryan was the Democratic candidate for President, on a platform which called for a lower tariff and the prevention of private monopoly. He was defeated by William H. Taft.

In 1912 he was a delegate to the Democratic National Convention at Baltimore, where he was influential in securing the nomination of Woodrow Wilson for President. In March 1913, he was appointed Secretary of State. On June 8, 1915, he resigned his office because of President Wilson's policy toward Germany in the Great War of Europe.

William Jennings Bryan played a prominent part in the movement for international peace, and his famous 'peace plan' led to the conclusion of arbitration treaties with more than thirty countries (see ARBITRATION, INTERNATIONAL).

In 1925 Bryan was prosecutor in the 'evolution trial' of John Thomas Scopes, a teacher in the Rhea County (Tenn.) high school, who was charged with violation of the Tennessee statute forbidding the teaching of the Darwinian theory of evolution. Defended by Clarence Darrow, Dudley Field Malone and Arthur Garfield Hays, Scopes was convicted and fined \$100. He published *The Menace of Darwinism* and *The Bible and Its Enemies* (1921) and *In His Image* (1922).

**Bryan, William Lowe** (1860- ), American educator, was born near Bloomington, Ind. In 1902 he became president of Indiana University.

**Bryant, William Cullen** (1794-1878), distinguished American poet and editor, was born in Cumington, Mass. At an early age he began to write verse, his first work being published in Boston in 1808, *The Embargo, or Sketches of the Times*. In 1817 his famous poems 'Thanatopsis' and 'To a Water Fowl' appeared in *The North American Review*. In 1826 he joined the editorial staff of the *New York Evening Post*, and three years later became its editor-in-chief and principal owner, a position which he held for fifty years, until

his death. He died in New York on June 12, 1878.

As a journalist Bryant was among the most distinguished of Americans, and his prose style was simple, straightforward, vigorous, and marked by common sense and breadth of view. His translations of the *Iliad* and *Odyssey* into English blank verse were published in 1870-72.

He is best known as a poet, however. To a tone of noble reflection on life and nature is added mastery of language and of metres. Writing with a restraint that sometimes gives the impression of coldness, he produced blank verse of a high order, and other poetry that gives him an enduring place in American letters. Among his well-known poems are 'Lines to a Waterfowl,' 'The Fringed Gentian,' 'The Death of the Flow-ers.'

Bryant's son-in-law, Parke Godwin, prepared the final edition of *The Poetical Works and Prose Works of William Cullen Bryant*, and wrote the standard *Life*.

**Bryce, George** (1844-1931), Canadian author and educator, was born in Mount Pleasant, Brant co., Upper Canada. He was one of the founders of Manitoba University. His chief books are: *A Short History of the Canadian People* (1887; new ed. 1913); *The Romantic Settlement of Lord Selkirk's Colonists* (1909); *The Scotsman in Western Canada* (1911); *Life of Lord Selkirk* (1912).

**Bryce, Viscount James** (1838-1922), British statesman, diplomat, and man of letters, was born in Belfast, Ireland. In 1886 he was Under-Secretary for Foreign Affairs in Gladstone's first administration; in August, 1892, when Gladstone was again in power, he became Chancellor of the duchy of Lancaster, with a seat in the Cabinet.

During the Home Rule debates of 1886 and 1892, Viscount Bryce was a strenuous supporter of Gladstone's proposals. From February, 1907, to November, 1912, he was British Ambassador to the United States. In 1913 he was appointed a member of The Hague International Prize Court; and on Jan. 1, 1914, was created Viscount Bryce of Dechmont. He served as chairman of the commission appointed by the British government in 1915 to investigate alleged German atrocities in Belgium, and made valuable reports, also, on other phases of the war.

In 1862 Viscount Bryce published *The Holy Roman Empire*, an expansion of his Arnold Prize essay, which placed him in the front rank of historical writers. He also

wrote: *Two Centuries of Irish History* 1691-1870 (1888); *Impressions of South Africa* (3d ed. 1899); *Studies in History and Jurisprudence* (1901); *Studies in Contemporary Biography* (1903); *International Relations* (1922). He is best known in the United States by his *American Commonwealth*.

**Bryce, Lloyd** (1851-1917), American author and diplomat, was born in Flushing, N. Y. He was proprietor and editor of *The North American Review* from 1889 to 1896. In 1911-13 he was U. S. Minister to the Netherlands and Luxemburg; and was a delegate to the Second International Opium Conference. He wrote: *Paradise* (1887); *A Dream of Conquest* (1889); *The Romance of an Alter Ego* (1889); *Friends in Exile* (1893).

**Bryn Mawr College**, a leading institution of higher education for women at Bryn Mawr, Pa. The college was established through the gift of Dr. Joseph W. Taylor, who purchased the site and left the greater part of his estate to the college. It was incorporated in 1880, and instruction was begun in 1885. The general scheme of instruction is based on the university model. For recent statistics see Table of American Universities and Colleges under the heading **UNIVERSITY**.

**Bryony**. In Europe, two unrelated climbing plants are known by this name. One is the white-rooted *Bryonia dioica*, of the gourd family and the other, or black bryony (*Tamus communis*), known also as Our Lady's Seal, belongs to the yam family.

**Bryum**, a large genus of common mosses, forming on damp earth and rocks.

**Brzezany**, town in Poland, formerly Austrian Galicia; 31 miles southwest of Tarnopol. In the course of the Great War it was occupied by the Russians (September, 1914), but was evacuated a year later towards the end of their great retreat; p. 6,008.

**B. T. U.**, or **British Thermal Unit**, is the unit quantity of heat employed by engineers. It will raise the temperature of one pound of water one degree Fahrenheit.

**Bubastis**, once a famous city, now ruins (TELL BASTA), in the Nile delta, Lower Egypt. The ruins of its temple to the goddess Bast were discovered by M. Naville in 1887. Excavations revealed that Bubastis was once the seat of a great Hyksos settlement.

**Bubblfil**, trade name of an insulating material developed by du Pont as a possible substitute for kapok and sponge rubber.

**Bubble-shell (Bulla)**, a genus of gastropod molluscs in which the oval shells are thin, with a concealed spire, and usually pret-

tily marked with blotches of color on a pale ground.

**Bubo**, an inflammatory swelling of a lymphatic gland in any part of the body. The term is usually confined to swelling of the glands of the groin. In the most frequent form of plague, buboes appear early, situated in neck or groin, for the most part. Hence the term 'bubonic plague.' See **PLAGUE BUBONIC**.

**Bubonic Plague**. See **Plague, Bubonic**.

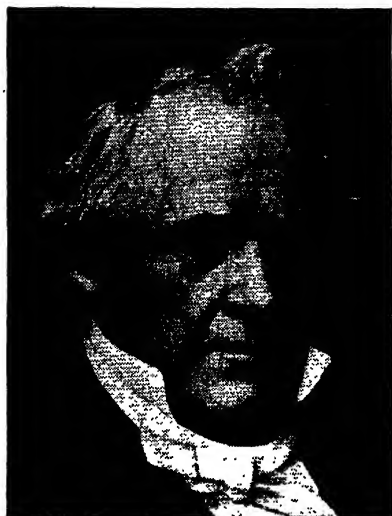
**Bucaramanga**, capital of the department of Santander, Colombia. It is one of the three great coffee markets of Colombia, and is also an important center for tobacco and cotton. Iron, copper, and gold, and allied minerals are found in the region; p. 44,400.

**Buccaneers**, or **Filibusters**, piratical adventurers of divers nationalities who preyed upon Spanish trade and property in the West Indies and on the neighboring mainland in the seventeenth century. The buccaneers were originally smugglers, who made San Domingo and Tortuga their headquarters. San Domingo was full of wild cattle, and the buccaneers took their name from the grating or barbecue on which the flesh was roasted, which in the Indian language was called a *boucan*. The flesh was called *viande boucannée*, and the hunters *boucaniers*. Eight years later, Spain destroyed this settlement; but the adventurers returned in force, and thenceforward, for about seventy years, were the terror of the Spaniards in that part of the world. The British conquest of Jamaica in 1655 gave the buccaneers a new headquarters. New Segovia, in Honduras, was taken and sacked in 1645. The leaders among the earlier buccaneers were Montbars and Olonnais, Frenchmen, Mansvelt, and Henry Morgan, who distinguished himself especially by the capture and sack of Porto Bello. After the Treaty of Ryswick buccaneers were discountenanced by both England and France, and from that time they gradually disappeared, although bands of pirates lingered on at Providence in the Bahamas. See **FILIBUSTER**; **PIRACY**.

Consult Stockton, F. R., *Buccaneers and Pirates of Our Coasts* (1898); Pringle, Patrick, *The Jolly Roger* (1953); Snow, E. R., *True Tales of Pirates and Their Gold* (1953).

**Buccleuch Family**. The Border house of the Scotts of Buccleuch is traced back to Sir Richard le Scot, a man of distinction in the reign of Alexander III. of Scotland. He died in 1320, and from him was lineally descended Sir David Scot of Braxholm. His grandson

was Sir Walter Scott of Branhholm and Buccleuch, who figures in the *Lay of the Last Minstrel*, written by his famous namesake. The first 'Lord Scott of Buccleuch' was Sir Walter Scott, warden of the Western Marches, who is celebrated for his rescue of one of his attendants, 'Kinmont will,' from the castle of Carlisle. The title Earl of Buccleuch



James Buchanan (1857-1861)

was granted in 1619 to one of the family who served as commander of a regiment under 'he states of Holland against the Spaniards.

**Bucentaur**, the name of the state galley of the republic of Venice, in which the doges annually, from 1311 to 1789, on Ascension day, 'married the Adriatic,' in token of Venetian supremacy over the seas. This custom is traced to a naval victory gained on Ascension day in 1177 by Doge Sebastiano Liani over the emperor Frederick Barbarossa. The last *Bucentaur*, made in 1722-9, was burned by the French in 1798.

**Bucephalus**, favorite charger of Alexander the Great, which died on the banks of the Hydaspes in Northern India in 326 B.C.

**Bucer**, or **Butzer**, **Martin** (1491-1551), German reformer, was born in Lower Alsace. He entered the Dominican order at fifteen, but was converted in 1518 by Luther and the writings of Erasmus to the reformed faith. In 1521, having been released from his monastic vows, he became court preacher to the Elector Palatine, and in 1523 pastor in Strassburg, which was henceforth the centre of Protestant learning. He brought about the

conference at Marburg in 1529. His *Correspondence* with the Landgrave Philip of Hesse was published by Lenz in 1880-91.

**Buch**, **Christian Leopold von**, **Baron von Gelmerisdorf** (1774-1853), Prussian geologist, was born at Stolpe. He contributed largely to the development of geological science, though his extreme view of the Vulcanian theory of the origin of the earth's crust is no longer tenable. He prepared an admirable geognostic chart of Germany in forty-two sheets (2d ed. 1832), and wrote monographs on the Terebratula (1834), Spirifers (1838), Leptæna (1842), and Cera-tites (1849). A complete edition of his works appeared in 5 volumes in 1867-85.

**Buchan**, district, now included in Banffshire and Aberdeenshire, Scotland. Lies between the rivers Deveron and Ythan. The coast line of 40 miles is mostly bold and rocky, was formerly a haunt of smugglers.

**Buchan**, **Alexander** (1829-1907), Scottish meteorologist, was born at Kennesswood. After 1878 he was curator of the library and museum of the Royal Society of Edinburgh. His works include, *Handy Book of Meteorology* (1867), *Introductory Textbook of Meteorology* (1871), and *Atmospheric Circulation and Oceanic Circulation* ('Challenger' Reports for 1889 and 1895).

**Buchan**, **John** (1875-1940), Scottish historian and novelist, was born in Perth. In 1906 he became a member of the firm of Thomas Nelson & Sons. He was private secretary to the High Commissioner for South Africa and his early publications were obviously based on his life there.

His latest books include *A History of the Great War* (1921-2); *John Macnab* (1925); *Witch Wood* (1927); and *Courts of the Morning* (1929).

Buchan became Lord Tweedsmuir. In 1935 he was appointed Governor-General of the Dominion of Canada. In the same year Gaumont-British adapted his novel of adventure *Thirty-Nine Steps* to the screen.

**Buchan**, **William** (1729-1805), Scottish physician, a native of Ancrum, Roxburghshire. His chief work, *Domestic Medicine* (1769), the first English book of its kind, reached its twenty-first edition in 1813.

**Buchanan**, **George** (1506-82), Scottish historian and scholar, was born in Killearn. He was engaged by King James V. as tutor to one of the king's natural sons, James Stewart, later abbot of Kelso. A satire entitled *Somnium*, in which the ignorance and depravity of the monks were held up to con-

tempt, brought Buchanan into great disfavor and when, at the instigation of the king, he published two others, *Palinodia* and *Franciscanus*, he was arrested and imprisoned. Escaping, he fled to England and then to France, where he taught in Bordeaux and in Paris. In 1547 he went to Coimbra, Portugal, and there taught in the newly established University, but his protestant views were looked upon with suspicion by the Portuguese clergy and he was confined in a monastery, where he began his beautiful translation of the Psalms into Latin. In 1551 he was released, returned to England, and then went to France.

The closing event of his life was the publication, 1582, of his famous *History of Scotland*. Two editions of his works have been published, one edited by Ruddiman (2 vols. 1715), and one by Burman (1725). Consult Irving's *Life of Buchanan*; P. Hume Brown's *George Buchanan, Humanist and Reformer*.

**Buchanan, James** (1791-1868), fifteenth President of the United States, was born of Scotch-Irish descent, near Mercersburg, Pa.

Buchanan's administration, 1857-61, covered a particularly trying and critical period in the history of the country, and his policy has been severely criticised. He was a conservative man, personally opposed to slavery but believed that unadvised interference by the North in the domestic concerns of the South was bound to create a state of affairs dangerous to the peace and prosperity of the nation.

During his administration diplomatic affairs were on the whole handled satisfactorily. Upon the actual outbreak of hostilities Buchanan reorganized his cabinet, surrounding himself with men of strong character and ability, under whose influence he displayed greater firmness and confidence in the handling of affairs. Consult Buchanan's own defense of his policy, *Mr. Buchanan's Administration on the Eve of the Rebellion* (1866); Curtis' *Memoir* (2 vols.); Rhodes *History of the United States from the Compromise of 1850* (5 vols.); *The Works of James Buchanan*, comprising his Speeches, State Papers, and Private Correspondence, edited by John Bassett Moore.

**Buchanan, Robert Christie** (1811-78), American soldier, was born in Baltimore, Md. He served in the Black Hawk, Seminole, and Mexican War, and in the Civil War, and for his services at Manassas and Fredericksburg he was brevetted major-general U. S. A. in 1865.

**Buchanan, Robert Williams** (1841-1901), English poet, novelist, and dramatist, was born in Warwickshire. His first volume of poems, *Undertones*, appeared in 1860; but he rose to a much higher level in his *London Poems* (1866). Among his subsequent poetical works are *The Book of Orm* (1870), *Balder the Beautiful* (1877), *The City of Dreams* (1888), and *The Wandering Jew: a Christmas Carol* (1893). A complete edition of his verse was published in 1901. As a playwright he wrote *Lady Clare*, *Sophia*, and *Joseph's Sweetheart*.

**Buchanan, William Insko** (1853-1909), American diplomat, was born near Covington, Ky. He was Minister to Argentina, 1894-1900; deciding arbitrator in the Argentina-Chile boundary dispute, 1899; first U. S. Minister to Panama; and, at the time of his death, agent for the United States in a case at the Hague Court between the United States and Venezuela.

**Bucharest**, or **Bukharest**, city, capital of Rumania, is situated on both banks of the Dimbovitza. On the right bank stands the old town, with many monuments and ruins; on the left is the modern city, including the business section. Although many of the streets are narrow and crooked, the city as a whole is attractive. There are several beautiful public gardens and many fine buildings. Of churches, mention may be made of the Cathedral (1656), which occupies a commanding site above the city, and the chapel Stravropolos, small, but a gem of Byzantine art. Manufacturing is not yet important, but commerce is well developed. The population numbers 641,000. In 1698 Bucharest became the capital of Wallachia. In 1862 it became the capital of Rumania. Negotiations between Russia and Turkey in May, 1812, resulted in the cession of Bessarabia and a part of Moldavia to Russia; in 1913 the Treaty of Bucharest settled the status of parts of European Turkey captured during the second Balkan War; and in May, 1918, the Rumanians here signed what is known as the Peace of Bucharest, which temporarily ended hostilities with the Central Powers.

**Bucharest, Treaty of.** See **Balkan War 1912-1913.**

**Buchmanism**, a religious cult founded by the Rev. Frank N. D. Buchman, born in Pennsburg, Pa., 1878, under the title of *A First Century Christian Fellowship*. Its stated aim is to spread Christianity by 'personalized evangelism,' chiefly among young people. Its conferences are called 'house parties.'

at which unreserved public 'confessions' are offered by the devotees. While gaining many adherents, especially in educational institutions, the movement has also aroused bitter opposition and condemnation on account of its 'emotional tension.' It was banished from Princeton University in 1924 by President J. G. Hibben, and in 1928 Oxford University students demanded that the cult be ended in the interests of academic peace. Some influential people in England as well as in America support the movement. The cult is now known as Moral Rearmament. Consult Bach, M. L., *They Have Found a Faith* (1946); Braden, C. S., *These Also Believe* (1949).

**Büchner, Eduard** (1860-1917), German chemist, was born in Munich. In 1907 he received the Nobel prize in chemistry for his discovery that the liquid obtained by crushing yeast with fine quartz sand and subjected to intense pressure possesses the power of setting up fermentation in solutions of grape sugar, maltose, invert sugar, etc.

**Büchner, Friedrich Karl Christian Ludwig** (1824-99), German physician and naturalistic philosopher, was born in Darmstadt. Of his works may be mentioned *Die Darwinsche Theorie* (5th ed., 1890); *Der Mensch und seine Stellung in der Natur* (1870; 3d ed., 1889).

**Buck, Dudley** (1839-1909), American composer and organist, was born in Hartford, Conn. His compositions include much church and secular music, including the opera *Serapis*; the comic opera *Deseret*, and the cantata *The Golden Legend*. He wrote a *Dictionary of Musical Terms*.

**Buck, Leffert Lefferts** (1837-1909), American engineer, was born in Canton, N. Y. He was a noted bridge builder. He rebuilt the suspension bridge at Niagara Falls, and while chief engineer of the Bridge Department in New York City, built the Williamsburg Bridge and had charge of the Manhattan Bridge plans.

**Buck, Pearl Sydenstricker** (1892- ), author, born in West Virginia. The daughter of a missionary, she spent most of her childhood in China. In 1917 she came to the U. S. for an education; subsequently she taught at the U. of Nanking (1921-31). She served as a Missionary in China. Later she resigned and came to the U. S. to live. She is highly sympathetic to the Chinese people and their culture. Her works include: *East Wind—West Wind*; *The Young Revolution-*

*ist*; *All Men Are Brothers*; *The Mother*; *The Exile* (1936); *Dragon Seed* (1941); *Pavilion of Women* (1946). *The Good Earth* Nobel Prize 1938; *The Hidden Flower*, 1952. She is Mrs. Richard J. Walsh in private life.

**Buckbean, Marsh Trefoil, or Bog Bean** (*Menyanthes trifoliata*), a plant belonging to the order Gentianaceæ, common to most parts of the United States. It grows in moist places. The leaves are bitter, and from them is prepared an extract used in stomach troubles and intermittent fevers. In Germany it is also used in the place of hops.

**Bucket Shop**, an establishment conducted ostensibly for the buying or selling of stocks or commodities, but actually with no intention of receiving and paying for the property so bought or of delivering the property so sold; in practice, therefore, simply a concern for the placing of wagers on the fluctuation of market prices. Its method of operation, generally speaking, is the same as that of the legitimate broker trading in margins, except that it does not buy the stock bargained for, or, if it does, soon sells it again instead of using it as collateral security for loans in order to get the money necessary to complete payment on the purchase. It is obvious, therefore, that bucket shops enjoy greater prosperity in a declining market. The New York Stock Exchange began a war on bucket shops as early as 1878; many of the States have enacted legislation prohibiting their operation.

**Buckeye, the Horse Chestnut.**

**Buckeye State, Ohio.**

**Buckingham, George Villiers, First Duke of** (1592-1628), was born at Brooksby, Leicestershire. During the negotiations for a treaty of marriage between Prince Charles and the Spanish Infanta, Buckingham accompanied the prince on his fruitless mission to Spain. In 1627 Buckingham commanded a fleet to relieve La Rochelle; but he was unsuccessful. The following year he planned a second expedition against La Rochelle, and proceeded to Portsmouth to embark, but was there stabbed to the heart by a disappointed officer named John Felton. Buckingham's character has been portrayed by Scott in *The Fortunes of Nigel*.

**Buckingham, George Villiers, Second Duke of** (1628-87), son of the First Duke of Buckingham. On the outbreak of the Civil War he served with the royal forces at the storming of Lichfield Close (1643) and at the restoration he became one of the most powerful men at court. At the accession of

James II. his public career was practically at an end. Sir Walter Scott has portrayed Buckingham in *Peveril of the Peak*.

**Buckinghamshire**, or **Bucks**, inland co. of England. The chief rivers are the Thames, Ouse, Ousel, Thame, and Colle. The northern part is largely given to pasturage; the vale of Aylesburg in the centre is one of the most productive districts in the country, and is famous for its sheep and dairy products. Agriculture is the leading industry, wheat, barley and oats being the principal crops; p. 386,164.

**Buckland, Francis Trevelyan** (1826-80), English naturalist. He published *Curiosities of Natural History* (1857-72). He was the highest authority of his day on pisciculture, and special commissioner on the salmon fisheries in Scotland (1870). His published works include *Fish-hatching* (1863), *Natural History of British Fishes* (1881), and *Notes and Jottings from Animal Life* (1882).

**Buckle**, a metal device for fastening straps or bands in garments, shoes, harnesses. Shoe buckles were introduced into England during the reign of Charles II, and, as they became more and more the vogue, were made of costly materials and richly adorned with precious stones. Their popularity waned towards the end of the 18th century.

**Buckle, Henry Thomas** (1821-62), English historian and sociologist. In 1857 the first volume of his *History of Civilization in England* appeared, meeting with great success in both Europe and America. A famous chess player.

**Buckley, James Monroe** (1836-1920), American clergyman and author. From 1880 to 1912 he was editor of the *New York Christian Advocate*.

**Bucknell University**, a Baptist coeducational institution of learning at Lewisburg, Pa., founded in 1846, and named in honor of a liberal contributor to its endowment funds.

**Bucknill, Sir John Charles** (1817-97), English physician, the highest authority of his time on insanity. He edited the *Journal of Mental Science* (1855-62), and was one of the founders of *Brain, A Journal of Neurology* (1878).

**Buckskin**, a soft, pliable leather of a yellow or grey tint, prepared from the skin of a buck or sheep. It is used for gloves and shoes and was formerly employed by the Indians and early American colonists for clothing.

**Buckstone, John Baldwin** (1802-79) English actor and dramatist, was born in

Hoxton, London. Buckstone was noted for his humor and pathos, and for his droll interpretation of comic characters. He wrote over a hundred dramas.

**Bucktails**, the name applied after 1812 to a faction of the Democratic-Republican Party in N. Y., identified with Tammany Hall, and opposed to De Witt Clinton and (after 1817) to the building of the Erie Canal. After Clinton's death (1828), it became the regular Democratic Party in the State. The name was derived from the insignia of Tammy—a buck's tail worn in the hat.

**Buckthorn**, a genus of hardy evergreen shrubs belonging to the order Rhamnaceæ, and including nearly 100 species found in all parts of the temperate zone. The Common Buckthorn, Waythorn, or Hartshorn (*R. calthartica*) is a spreading shrub, about 10 ft. in height, introduced into America from Europe. It is cultivated for hedges. Other species are the Alder Buckthorn, the Carolina Buckthorn or Indian Cherry (*R. carolinana*), and *R. crocea*.

**Buckwheat** (*Fagopyrum*), a cereal plant of the natural order Polygonaceæ, to which belong also the dock, sorrel, and rhubarb. Buckwheat is an annual, is erect in habit, and generally grows to a height of about 3 ft. The grain has a thick, hard, smooth hull, silver gray or brown in color. The flower is pink and fragrant and a favorite with bees. Buckwheat thrives best in a moist, cool climate. It matures in from 8 to 10 weeks, and is well adapted to high altitudes and short seasons. It succeeds fairly well on soils too poor for other crops, but is not specially adapted to heavy clays or wet lands. Seed is sown from May to September or, in northern localities, from the middle of June to the middle of July, either in drills or broadcast. Harvesting is begun soon after the first seeds are ripe. The varieties most commonly grown are the Common Gray, Silver Hull, and Japanese, the last being generally regarded as the best yielding variety. The buckwheat crop, while the least important of the six leading grain crops in the United States is nevertheless of considerable value as a source of food and is profitably grown for green manure, as a catch crop, and for the improvement of the mechanical condition of the soil. Buckwheat is remarkably free from plant diseases and insect pests. The leading States are Pennsylvania and New York, with Wisconsin, Michigan, West Virginia, Minnesota, and Ohio following, but far behind.

**Bud**. A bud is an unexpanded branch—

stem, leaves, and sometimes flowers being all present in a miniature and undeveloped form. This branch is formed in advance, so that, when spring and sunshine arrive, no time is lost in pushing ahead and effecting growth before winter again arrives and checks activity. As buds have often to live through severe



Buds.

- 1, 2. Acer and section. 3. Horse chestnut. 4. Pear flower-buds. 5. Walnut, extra axillary buds. 6. Honeysuckle, clustered.

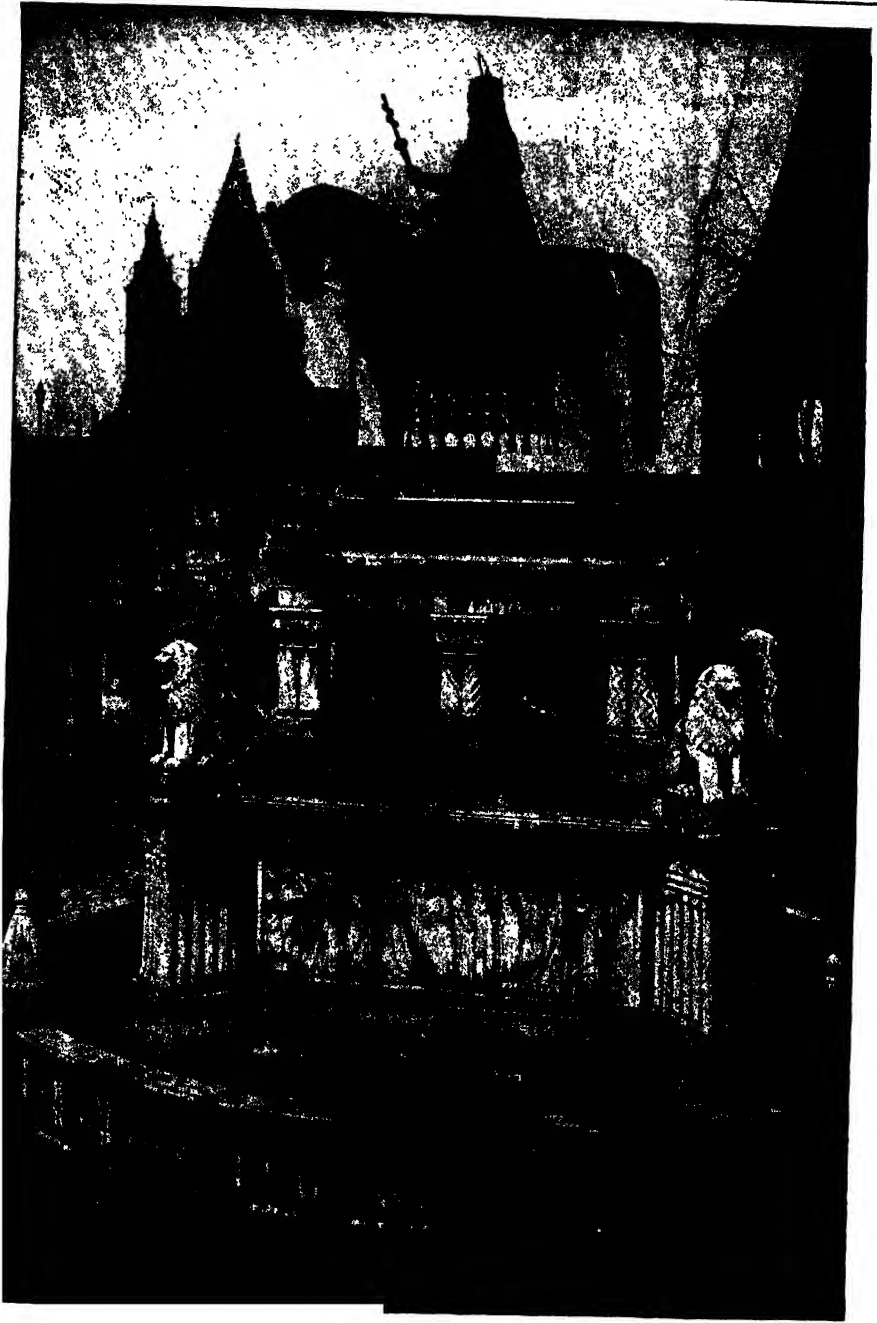
weather, with excessive cold and wet, their parts are packed tightly together, so that the minimum of surface may meet the outer world; they are usually covered by certain scales, which are modified leaf-bases, stipules, or leaves. Buds usually arise in the axils of leaves, though circumstances may cause them to form elsewhere. The so-called fruit-buds of apple and pear trees may usually be distinguished from those buds which will yield stems and leaves only, by their greater size, and by their being commonly situated at the end of a stem or spur.

**Budapest**, capital and chief city of Hungary, is situated on the Danube; 163 m. s.e. of Vienna. It consists of the two cities of Buda and Pest on opposite banks of the river. Six bridges, three of which are of the suspension type, cross the Danube here. Buda, on the west side of the river, is the older part of the city. It occupies the heights overlooking the Danube and contains the old fortress crowning the summit of a high hill. Pest, on the east bank of the river, is the finest and most important part of the city. Its centre is the quarter *Belváros* or the 'inner city,' beside the Danube, enclosed within a boulevard which has replaced the old city walls. From this boulevard the streets radiate to the n.e. and s.e. along the Danube the Francis Joseph quay stretches for a mile. Near its northern

end imposing new Houses of Parliament were completed in 1903. The botanical, public, and Orczy gardens and Margaret Island, once the seat of a convent, offer pleasant recreation grounds. The chief industries include engineering, flour milling, carriage building, printing, shipbuilding, brewing, distilling, and the manufacture of tobacco, glass, chemicals and fancy leather goods. There is a good trade in grain and wine, and the city is a railway centre with excellent street railway facilities; p. 1,724,735. A large percentage of the inhabitants are Roman Catholics, and there are many Jews.

Buda, or Ofen, originated in the Roman military colony of Aquincum, and was the capital of Lower Pannonia. Destroyed by the Mongols in 1241, it was rebuilt by Bela IV., and from 1351 to its conquest by the Turks in 1526 it was the residence of the kings of Hungary. While in Turkish hands, the city was six times besieged by the imperialist forces, who took it in 1686. The Hungarians stormed it in 1849. Pest existed from Roman times, but was not of much consequence till the 18th century. In World War II Hungary, under pressure, joined the Germans; Budapest was occupied by the Nazis in 1944 and a puppet government established. In 1945 the Russians liberated the city, but the fighting caused much damage.

**Buddha**, 'The Enlightened One,' was the founder of Buddhism. As a child he received the name of Gautama. He is also known as Siddhartha, and lived from about 560 to 480 B.C. It was not until his 29th year that Gautama saw the visions which led him to devote himself to the study of religion and philosophy. It is impossible, within the scope of this article, to follow Gautama in his wanderings and in his efforts to 'acquire merit.' Repeatedly tempted to return to the comforts of his home, assailed by doubts as to the reality of that virtue for which he had sacrificed so much, it was long ere, brooding in silent solitude under the bo-tree (tree of wisdom), there dawned the kindly light which enabled him triumphantly to exclaim, 'I know it all.' Henceforth he was the Buddha. On his return home his wife embraced his feet, and widowed herself in becoming one of the first Buddhist nuns. His son and his half-brother joined the order of pious mendicants which he established. His mission was the reformation of Hinduism. In spite of the inherent weakness of the creed he promulgated—its end contemplation, inertia, Nirvāna—there is much that is fascinating in Buddha's devo-



*Budapest, Hungary.*

Statue of St. Stephen, first King of Hungary, near the Royal Palace, above the Danube.



tion to duty, and in the example of a lifelong sacrifice which sought no selfish or sordid end. For a beautiful poetic rendering of Buddha's life and work, see Edwin Arnold's *Light of Asia* (1900).

**Buddhism.** The Buddhist scriptures do not contain a life of the founder, Gautama. He was born in the 6th century B.C., the age of Zoroaster, Thales, the second Isaiah, Lao Tszé and Confucius. At the age of 29 he became an ascetic, and after long search discovered a new 'way' of salvation. The faith which he then promulgated was Buddhism. In its inception Buddhism was a reformation and a protest against Brahmanism. Making no attempt to solve the problem of the origin of things, he proclaimed the equality and brotherhood of man, and that the great end and object of existence was to attain extinction of personality (*Nirvana*) by self-sacrifice, contemplation, and suppression of all passion. Subtly mingled with this inertia was the doctrine of *Karma*. This was a remodeling of the doctrine of transmigration. Innumerable 'precepts' and 'paths' of duty and of holiness point the 'way' by which each human being is to work out his salvation. The life of an insect is as precious as that of a man; therefore to kill the humblest creature is accounted murder. The encouragement of celibacy led to the formation of monastic orders, male and female. In process of time the monasteries became the repositories of learning. The Buddha wrote nothing. It was at least 130 years after his death, when the Emperor Asoka—the Constantine of Buddhism—assembled a council of monks, that the first attempt was made to reduce the teachings of Buddhism to writing. There are many passages of remarkable and poetic beauty to be found in Buddhist scripture. This 'knowledge of the way'—a religion without theology, without deity, and with no gorgeous ritual—was spread by mendicant missionaries, northwards over Nepal and Tibet, eastwards through Burma and China to far-away Japan, and over Ceylon in the south.

**Budding.** The process of budding consists in taking from the tree which it is desired to propagate a piece of the bark with bud attached, and inserting it beneath the bark and against the wood of the tree which is to serve as parent or stock. The process is chiefly employed in the propagation of peaches, but it is also much used for propagating plums, pears, and apples, and occasionally for multiplying choice varieties of maples and other ornamental trees. For further information,

see L. H. Bailey's *The Nursery Book* (1895); Batlet's *Grafting and Budding*.

**Budgerigar**, a dealers' name for the zebra grass-parakeet of Australia. It is a small bird, about 7 in. long, in color a yellowish green striped with black, and having two blue tail feathers. Its natural voice is soft and musical and it makes an attractive cage bird. America and England import large numbers of these birds. See **PARRAKEET**.

**Budget, Family or Individual**, a plan for the expenditure of the family or personal income. The accounting side is one of great importance as the budget must be checked by accounts kept under the same headings as those under which money is assigned in the budget. Without such careful checking of accounts the budget has little value. *The Cost of Living*, published in 1899 by Ellen H. Richards first called attention in the United States to the importance of the family budget. Many statistics have been gathered giving the expenditure of selected families (usually those of low or very moderate income) classified under a few general headings. These figures have been used in consideration of the minimum wage or the lowest possible cost of living decently for a family or individual. The U. S. Treasury Department from 1914-1918 did much to encourage the use of the family budget. This work is now being carried on by the Bureau of Home Economics of the Department of Agriculture. Food, clothing, shelter, operating expenses, and advancement are the main subjects listed in the usual personal or family budget, with such subheads as health, recreation, insurance, and savings, the last-named to run from 10 to 20 per cent. according to the size of the income. Any bank will be glad to advise as to where to get a good printed budget plan.

**Budget, Governmental**, defined as a periodical financial document forecasting revenues and expenditures during a certain period, usually one year, it also generally includes a report of receipts and expenditures during the fiscal period just closed and proposals for raising money to meet expenditures during a future period, besides the financial condition of the treasury and the prospective condition of the treasury following the enactment of appropriate legislation putting into effect the proposals in the budget. In the United States there was no Federal budget system until 1922. Congress voted annually the appropriations needed to cover the estimates of expenditures of various departments. Various committees of both houses framed the bills—

each working independently of the other—without any general coördination of effort and without reference to a general financial program. In 1912 President Taft's non-partisan Commission on Economy and Efficiency recommended to Congress the adoption of a responsible budget system. The Institute for Government Research, created in 1916, carried on the work of President Taft's Commission. The McCormick-Good Budget Bill was approved by President Harding, 1921, and Charles G. Dawes was appointed first Director of the Budget. The budget act authorizes the President to transmit to Congress on the first day of each regular session the budget containing an estimate of the expenditures and appropriations necessary for the support of the government for the ensuing fiscal year. The act established within the Treasury Department, but independent of that department, a Bureau of the Budget, in charge of a Director and Assistant Director, appointed by the President. The chief duty of this Bureau is to prepare the budget and to this end it is empowered to assemble, correlate, revise, reduce or increase the estimates of the several departments and establishments, prepared by the budget officer of each department, which officer is appointed by the head of each department. The President may also direct the bureau to make detailed studies of the departments in order to determine what changes should be made in the interest of economy and efficiency. Officials of the bureau have authority to inspect books and records of any department that they may wish to inspect.

For further information on the United States budget for any current year, see the *Annual Report of the U. S. Secretary of the Treasury* for that year; also the *United States Daily*, the *New York Times*, and the *Commercial and Financial Chronicle*. For the recent changes in budget figures and methods, see article on THE NEW DEAL. For various publications which discuss in detail the budget problems and procedures of the government, consult *Price List 28, Finance*, Supt. of Documents, Washington, D. C.

Some legal provision with regard to the budget has been made in the United States dependencies, Philippine Islands, Hawaii, Alaska, and Porto Rico.

**Büdos-Hegy**, a volcanic peak of the Carpathian Mountains, in the eastern part of Transylvania. It is some 3,000 ft. high and is known as the 'Stinking Mountain,' due to

the fumes from the vast beds of sulphur near by.

**Budweis**, or **Budejovice**, town, Czechoslovakia, on the Moldau. It is an active trading and industrial town. The cathedral (1500), municipal museum, and episcopal residence are notable; p. 44,022.

**Budworm**, or **Bollworm**, is the name in the Southern United States for the caterpillar of a very destructive moth (*Heliothis armiger*), better known in the North as the tomato fruit-worm. It attacks the flower buds of the corn (maize) and the bolls of the cotton plant. It also feeds upon a great variety of garden vegetables and flowers. See **BOLLWORM**.

**Buenaventura**, seaport, Colombia, near the mouth of the Dagua River. It is the most important Colombian port on the Pacific. Most of the city was destroyed by fire in 1931, but is being rebuilt; p. 14,515.

**Buena Vista**, **Battle of**, an important and decisive battle of the Mexican War, fought near the little village of Buena Vista, state of Coahuila, Mexico, on Feb. 22-3, 1847, between an American force under Gen. Zachary Taylor and a Mexican force under Gen. Santa Anna. Taylor by fine generalship and the intrepidity of his troops, beat back the Mexican attacks. See **MEXICAN WAR**.

**Buen Ayre**, the most easterly of the Dutch West Indies, off the western end of the Venezuelan coast. Area, 95 sq. m. It is a dependency of the Curaçao colony and has a port called Buen Ayre at the eastern extremity. The chief products are timber and cattle; p. 15,687.

**Buenos Aires (Ayres)**, ('good air'), the most populous and progressive province of the Argentine Republic. It is bounded on the n. by the provinces of Córdoba, Santa Fé, and a part of Entre Rios, on the e. and s. by the Atlantic Ocean, and on the w. by El Pampa territory and part of the Territory of Río Negro. The area is 117,777 sq. m., the surface for the most part a vast plain intersected by numerous streams and studded with lakes. Buenos Aires is essentially an agricultural country devoted to cattle raising and wheat growing. Manufacturing thrives in some of the larger towns. The roads are good and the rivers are in general navigable. The Atlantic coast, 740 m. in length, and the river Paraná, 150 m., contain twelve ports, the chief being Ensenada and Bahía Blanca, besides Buenos Aires, which has been federalized. The capital of the province is La

Plata. Extensive lands have been acquired by the Jewish Colonization Association, some of which are under cultivation. The school system, which has been inadequate, is being extensively improved; p. 4,408,373.

**Buenos Aires**, capital of the Argentine Republic, is the largest city in South America and, aside from Paris, the largest city of the Latin races in the world. It is situated on a level plain about 25 ft. above the sea. Six railroads have their terminal stations in the city and twelve transatlantic steamship

and library, the Cathedral, post-office, terminal station of the Great Southern Railroad, the National Gallery, the Bolsa de Comercio, the new Stock Exchange. Shoes, blankets, cotton, flour, glass, machinery, hats, tobacco, leather, and canned goods are manufactured. Exports consist chiefly of meat, grain, leather, and wool. The principal trade is with Great Britain. Vessels of all countries serve the city. The chief harbor was constructed at enormous expense but the channels require constant dredging. Since 1850 Buenos



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*Colossal Statue of Buddha at Kamakura, Japan.*

It is 49 feet high, 97 feet in circumference, and weighs about 450 tons.

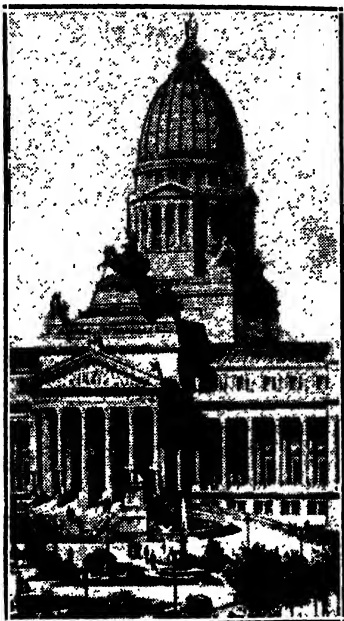
lines make it their terminus. The climate is temperate, ranging from 55° to 79° F.; frost seldom occurs, and rainfall is abundant, averaging 34 inches annually.

There are several wide boulevards and many beautiful parks, walks, and squares, the finest being the Plaza de Mayo, adjoining which are the Government House, the Cathedral, the Hall of Congress, and other public buildings. Buenos Aires has one of the most complete tramway systems in the world, and two subways linking the western and central parts of the city. The principal public buildings are the Casa Rosada, or Government House, the University, with the state museum

Aires has had a rapid gain in population. During the last quarter of the 19th century, when the attention of Europe was drawn to the exceptional resources and business opportunities of the Argentine Republic, immigration, chiefly Spanish, Italian, French, and Russian, reached large proportions; p. 2,981,043.

Buenos Aires was founded in 1530 by a Spaniard, Pedro de Mendoza, and French, English, and Dutch attempts to capture it proved unavailing. At the time of the insurrection of Spanish-American colonies against Spain, it took a prominent part in the struggle, and the revolutionary Congress met here in 1810. In 1816 it became the capital of the

Republic of the United Provinces of the Rio de la Plata, a name superseded by that of the Argentine Republic. In 1851 Buenos



*House of Parliament  
in Buenos Aires,  
Argentine.*

Aires seceded from the Republic and became a separate state until 1859, when it re-entered the confederation. In 1880 it was declared Federal property and became the capital of the country.

**Buffalo**, a kind of wild ox with the horns flattened and angulated, not rounded as in oxen and bison, and placed below the vertex of the skull. The true buffaloes are confined to the Old World, occurring especially in India and Africa, but the name is popularly applied also to the bison of North America.

The large Indian, Asiatic, or Water Buffalo (*Bubalus buffelus*) has beautiful twisted horns, somewhat triangular in section, thick and broad at the base, and with a spread sometimes as great as six feet. The animal measures about 7 ft. in length, and stands about 4 ft. high at the shoulder. It frequents marshy lands. This buffalo is a powerful animal, capable of dragging or carrying a far heavier load than the ox. It exhibits a considerable amount of intelligence and in a state of domestication is capable of becoming

very docile. In a wild state the animal is savage and dangerous.

The Cape, or Black, Buffalo, of Africa, is a large, fierce animal and is never domesticated. It measures about 8 ft. from the root of the horns to the tail, and the height is 5½ ft. Large herds of Cape buffaloes were formerly seen, but their numbers have been so depleted by sportsmen that bands of five or ten are now more common. Buffaloes are also found in Egypt, the Sudan, Hungary, Spain, and Turkey.

**Buffalo**, city and port of entry, New York, county seat of Erie co., and one of the most important commercial and manufacturing cities in the United States, second in population in the State and fifteenth in the United States. It is situated at the eastern end of Lake Erie, at the head of Niagara River, 20 m. above the Falls, and is the western ter-



*Copyright by Detroit Photo Co.*

*Buffalo: Albright Art Gallery.*

minus of the Erie Canal. Buffalo is beautifully situated on a plain rising gradually from the lake and covers an area of 42 sq. m. There are more than 600 m. of paved streets, generally shaded by fine trees. Delaware Avenue is the leading residential street, and Main Street, running n. from the lake, the principal business thoroughfare. Other notable streets are North, Summer, Front Avenue, Richmond Avenue, Broadway, and Lincoln Parkway. The park system is very fine, with six large and thirty or more small parks. Institutions for higher education include the University of Buffalo, state normal school, Buffalo Seminary for Girls, Academy of the Sacred Heart, Canisius College, D'Youville College for Women.

By virtue of its position and commercial facilities, Buffalo is one of the country's greatest ports. It is an important railroad centre and is the terminus of several steamship lines. Federal, State, and municipal enterprise have all contributed to the im-

provement of shipping facilities. In annual tonnage Buffalo usually ranks fourth or fifth among American ports. Buffalo is an immense grain port, handling the bulk of the grain from the Western States and the Canadian Northwest *en route* to the Atlantic seaboard. Manufacturing industries include iron and steel production, manufacture of steel cars and car wheels and of machinery, oil refineries, slaughtering and packing establishments, brickyards, and soap, starch, cigar, furniture, leather, stove, surgical instruments, carriage, harness, and cutlery factories. Power for these industries is obtained chiefly from Niagara Falls, but a part is procured from a steam generating plant recently completed.

The population in 1950 was 580,132. Buffalo had a commission form of government from 1916 to 1928. On January 1, 1928, a new charter went into effect, restoring government by mayor and council. The electorate chooses a mayor, a comptroller, a president for the council, five councilmen at large, and nine district councilmen. The mayor is endowed with strong executive powers; he cannot be elected to succeed himself at the expiration of his four-year term. The council, with powers of confirmation, appropriation, and taxation, serves as a check.

The history of Buffalo dates from 1798 Joseph Ellicott, agent of the Holland Land Company, began the first survey for the town of Buffalo, which he called New Amsterdam. In 1810 the town of Buffalo, so called from the visits of the bison to the neighboring saltlicks, was incorporated. During the War of 1812 Buffalo was the scene of several naval engagements and in 1813 the town was burned by the British. The building of the Erie Canal gave to the city its commercial importance, and from its opening in 1825 Buffalo increased rapidly in wealth and population. In 1901 the Pan-American Exposition was held in Buffalo and President McKinley was assassinated (Sept. 6) here by an anarchist fanatic. In 1927 the International Peace Bridge was dedicated, a vehicular bridge between Buffalo and Fort Erie, as a memorial of a century of peace between the United States and Canada. In 1932 the city celebrated the hundredth anniversary of its incorporation. Consult Powell's *Historic Towns of the Middle States*; J. N. Larned's *History of Buffalo* (1911); publications of the Buffalo Historical Society.

**Buffalo Berry** (*Shepherdia argentea*), a shrub found in the northwestern part of the United States, especially in the Upper Mis-

issippi valley, whose branches are thickly covered in the autumn with silvery leaves and clusters of crimson berries somewhat resembling the red currant. It is cultivated for ornamental purposes, and the berries are sometimes used to make jellies.

**Buffalo Bill.** See Cody, W. F.

**Buffalo Fish**, one of the large hump-back suckers of the family Catostomidae, of which several species dwell in the Mississippi River and its tributaries.

**Buffalo Gnat**, a gnat (*Simulium meridionale*) of the interior of the United States, related to the Eastern blackfly, and annoying to cattle and smaller animals. Its mode of reproduction and habits are similar to those of the mosquito. When first encountered by frontiersmen they thronged about the bison herds.

**Buffalo Grass** (*Bulbils dactyloides*), a grass common to the western plains of North America, from Manitoba to Texas. It is usually about 6 inches high; it spreads by runners as well as by seed, and soon forms a thick sod. It is an excellent pasture grass and furnishes nutritious food for all kinds of stock.

**Buffalo Moth**, a name given to the larva of a beetle under the erroneous idea that it was the young form of a moth, and because it first began to be observed in the neighborhood of Buffalo, N. Y. It destroys carpets, woolens, etc.

**Buffalo, University of**, a co-educational institution of learning established in Buffalo, N. Y., in 1846. For the first 40 years of its existence it consisted solely of the college of medicine. In 1901 the Gratwick Cancer Laboratory, the first in the world to be established for the study of cancer, was erected here.

**Buffington, Adelbert Rinaldo** (1837-1922), American soldier, was born in Wheeling, W. Va. He began service in the ordnance department of the army, with which he was always associated.

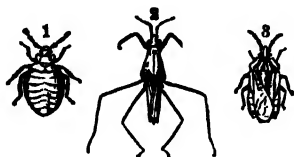
**Bufflehead**, a common small fresh-water duck of the north temperate portions of North America (*Charitonetta albeola*), so called because the long feathers on its head suggest the shaggy mop about the head of the bison ('buffalo'). It is about 13 inches in length and has a handsome plumage and delicate flesh, and is a favorite among sportsmen.

**Buffon, Georges Louis Leclerc, Comte de** (1707-88), French naturalist; superintendent of the Jardin du Roi, the present Jardin des Plantes and Museum of Natural

**History.** Here he began his famous *Histoire Naturelle*, which came in its final form to 44 volumes, eight published after his death. This was one of the first works to present information of this kind to the general reader in the attractive and interesting form.

**Bug**, the name of two rivers of Russia. The Southern or Black Sea Bug rises in Volhynia and follows a southeastern course through the governments of Podolia and Kherson, to Nikolaiev, where it joins the Dnieper. It is 450 m. long but is navigable only from Nikolaiev to the sea. The Western or Polish Bug, an affluent of the Vistula, rises on the eastern slope of the Carpathians, in Galicia, and falls into the Vistula some 20 m. n.w. of Warsaw, after a course of 450 m. Of its whole extent, more than half is navigable for vessels of moderate size. This river was the scene of fighting between the Russians and the Germans in 1915; again in 1941.

**Bug**, a name used sometimes to denote all the insects included in the order Hemiptera and sometimes reserved for one section of this order, the Heteroptera. Bugs are characterized by the fact that the mouth is adapted for sucking; their food consists of the juices of plants or the blood of animals; and as reproduction is frequently very rapid, they may be of great importance in connection with agriculture. They include arboreal, terrestrial, and marine forms. See HEMIPTERA; HETEROPTERA; BED BUG; BOAT FLY; CHINCH BUG; WATER BUGS.



Bugs: 1, Bed-bug; 2, Skater (Aquatic); 3, Bark-bug (*Ara-dus depressus*)

**Buga**, town, department of Valle, Colombia, at an altitude of 3,396 ft., on the north bank of the Guadajajara. The fertility of the region is famous, and large shipments of coffee and sugar-cane are made from this point; p. 19,595.

**Bugge, Elseus Sophus** (1833-1907), a Norwegian antiquary and philologist. His specialty was old Norse literature and archaeology, including the Germanic languages, and notably Anglo-Saxon. In 1867 he issued an edition of the songs of the *Edda*; English

trans., *The Home of the Eddic Poems*, by Schofield.

**Buggy**, a light, one-horse, four-wheeled vehicle with or without a hood.

**Bugis**, or **Buginese**, a Malayan people originally inhabiting the southern peninsula of Celebes, but now spread all over the East Indies as merchants and traders. They are lighter in color than the Malays, and resemble the Javanese in appearance. They are Mohammedans by religion.

**Bugle**, (*Ajuga*), a palearctic genus of Labiatae. The Common Bugle is abundant in Europe. Its flowers are generally blue, but white and purplish varieties are sometimes grown in flower borders. *A. alpina* is one of the beautiful flowers of the Swiss Alps.

**Bugle**, a treble wind instrument of copper or brass emitting a penetrating note, used for purposes of military signalling. It has a smaller bell and a shorter tube than the trumpet. It is made in the key of B-flat, and its effective notes are the open notes of the tube —C (below the stave), G, C, E, G.

**Bugle Calls** are used as *warning* and *formation* calls to denote the hours of service, alarm calls, such as *Fire Call*, *To Arms*, *To Horse*, etc., and as drill signals to large or scattered bodies of troops, as when drilling in extended order. In a garrison where no band is stationed, the bugles play for marching, having replaced the fife and drum for this purpose.

**Buhrstone**, or **Burrstone**, a name given to certain quartzose rocks, the worked surfaces of which possess the property of cutting or grinding. They are used principally as millstones. American production is supplied chiefly from New York, Virginia and Pennsylvania.

**Building.** The erection of any edifice is the work of several distinct trades, and an account of masonry, bricklaying, carpentry, concrete, stucco, steel and iron construction and the like, will be found under their several titles. Here we shall indicate the manner in which these trades coöperate under the architect and general contractor. Excavation is measured by the cubic yard. 'Sheathing' or timbering the sides of excavations is necessary in soft ground, and is measured by the square yard; and concrete work is measured by the cubic yard when above 12 in. thick, but by the superficial yard when below that thickness. *Mason work* is carried out by brick masons and by stone masons.

The many subdivisions of work on a modern building have brought about the forma-

tion of large construction companies, that handle the detail incident to the erection of an important building, and relieve the architect of much labor. For a house of wood the *carpenter* has to put in lintels and bucks; floor-joists; roof, consisting of joists, rafters,

tractor, to be connected to the house drain by the *plumber*. The *plumber* puts in the pipes and equipment for the entire water and drainage systems, including kitchen and bathroom fixtures and supply systems, as well as making connections if necessary for the heating system. The roofer covers the sheathing with building paper and proceeds to lay whatever kind of roofing is desired. Shingles, singly or in strips, of fireproof asphalt materials are replacing in many cases the wooden shingles of a generation past. The plasterer follows the carpenter for interior work, unless some of the recent prepared sheathings are used. Wiring for electricity is done before the walls are finished by the painter and paperer, the carpenter meanwhile completing his work on windows and interior finish. See BRICKLAYING, CARPENTRY, MASONRY, STRENGTH OF MATERIALS.

**Building Acts**, statutes enacted by the legislature or regulations of local authorities prescribing in the interests of the public health and safety, the form, height and materials of buildings. In the United States, where private rights of property are protected by constitutional provisions against legislative interference, the validity of such regulations has frequently been questioned, but their constitutionality has invariably been sustained as a proper exercise of the police power vested in Congress and reserved to the several States. To the acts regulating building for purposes of safety there have recently been added laws governing the type and style of buildings in certain areas, restricting for residential purposes or in cities as to height and distance from the street. These are called zoning laws.

**Building and Loan Associations**, a method of helping people to become their own landlords which is about a century and a half old. It had its beginning in England somewhere about 1785 or 1790 in Birmingham, and soon spread to other countries. The United States has had the greatest development of this plan, which ranks high as an aid to people of moderate means to obtain homes, and to save. The method is used not only in England, but in the British colonies, in Belgium, Germany and to a very limited extent in a few other countries. In the United States the plan was first tried in Frankford, a suburb of Philadelphia, in 1831; it was tried in New Jersey in 1835, and has now spread into every State in the country, operating on a very large scale. The basic plan of the building and loan association is the com-



Bugle Calls.

and tie beams, covered with a layer of sheathing; the studding is erected for lath and plaster partitions; and furring strips are nailed to the under side of joists; while strips are nailed along the sides of each joist for the pugging-boards to rest on. The *roofer* sets the leader heads or baskets, and the leaders and gutters are furnished and set by the con-

munity mutual help idea, and its brilliant success is due to the fact that it operates locally in a close community of interest, developing the community where it operates and thus increasing the values of its members, and avoiding danger by its ability to appraise land values accurately from close local knowledge.

There are various types of building and loan shares, which in series form usually terminate in three, six, or twelve months; some companies, issuing a new series of stock every year. Some issue 'prepaid shares,' at a fixed price payable outright, participating fully in the profits as do the instalment shares, although some limit it to a fixed rate of interest; the additional share in the undivided profits, if any, being held until maturity. This is called the guarantee stock plan, which has had wide advance in the West.

Building and loan shares have, prior to maturity, two values: holding a book value, and withdrawal value; the latter the sum fixed by each association as the value to be paid back in case the shareholder desires to quit membership in such associations as permit withdrawal. The building and loan association, it might be said, is an industry and not a banking institution. It sells a concrete product—mortgages on real estate, on long-term credit. It is a strictly mutual, participating enterprise.

During the depression from 1929 onward, many building and loan societies were unable to meet their obligations. By 1935, however, they had begun to meet their deferred payments, frequently with accumulated interest. See also RECONSTRUCTION FINANCE CORPORATION (RFC).

**Building Lease**, a lease of land in which the tenant undertakes to improve the premises by the erection of dwellings, stores or other buildings. The rental in such cases is known as a ground rent.

**Building Stone**, a stone suitable for use in the erection of buildings. The qualities necessary to a first-class building stone are so many that it is rare to find a material which combines them all and is, at the same time, accessible, abundant, and cheap. One prime essential is ability to resist a great, crushing stress, and to bear the weight of a lofty superstructure. This excludes nearly all clay rocks and shales and such granular limestones as chalk, and renders firm, fine-grained sandstone and crystalline rocks such as granite of special value for some kinds of work,

as the pillars and abutments of bridges. Resistance to atmospheric action and weathering is of great importance, especially in structures which are meant to endure. A good building stone should also be of uniform and pleasing color; not liable to discoloration on exposure, as are many sandstones which contain pyrites and compounds of iron; obtainable in large blocks and in any quantity; not too expensive to saw and dress; accessible, and easily quarried.

The best varieties of granite are durable, strong, impervious to moisture, and, when of suitable color, have a pleasing and even ornamental effect. There are a great number of localities in the United States where good granites occur. These are distributed through many of the States. Sandstone has been one of the most widely used of building stones, most of the large cities being to a great extent built of it; but it is now little used. Limestones are widely employed, especially in the Mississippi Valley. Nearly one-half of the total value of stone produced in the United States is of this rock. Indiana, Pennsylvania, Illinois and New York are the leading producers, the Indiana product alone being nearly twenty million dollars annually. There are many fine marbles in the United States and more rarely other decorative stones mostly used for interiors. Consult Bowles, Oliver, *The Stone Industries* (2nd ed. 1939); Johnson, J. B., *Johnson's Materials of Construction* (8th ed. 1939).

**Buitenzorg**, town in interior of Java.

**Bukhara**. See **Bokhara**.

**Bukowina**, or **Bukovina**, a division of Rumania, which stretches from the Dniester across the Pruth and Sereth, and up the eastern face of the Carpathians to the border line with Transylvania; area, 4,030 sq. m. It is very mountainous, and almost one-half of the surface is covered with forests (beech, conifers, alder, etc.). The principal crop is maize. Much fruit is grown, especially in the valley of the Suczawa. It contains many interesting and unique examples of art and architecture. There is a university at Czernowitz, the capital. Bukowina formerly was a crown land of Austria but was allotted to Rumania in 1918. During the war the Russians overran Bukowina in January, 1915, but were subsequently compelled to evacuate it, owing to the general retreat of their armies in that year. It was recovered in June 1916. When Rumania entered the war the Russians established contact with the Rumanian troops in the southern Bukowina.



In 1940 Russia demanded cession of northerly Bukowina and promptly occupied it. Rumania did not resist; p. 810,000.

**Bulacan**, province, Luzon, Philippine Islands, situated about the middle of the island; area, 841 sq. m. The exuberant vegetation has won the province the name of 'the garden of the Philippines.' Rice, corn, sugar, indigo, benesed, cacao, and coffee, are produced abundantly, and there are rich deposits of coal, copper, lead, silver and magnetic ores. Transportation facilities are excellent and include rail and wagon roads and navigable streams. Malolos, the capital, is 20 m. n.w. of Manila.

**Bulan**, pueblo, Luzon, P. I., near the extreme southern end of the island. It is a port of call for coastwise steamers; p. 29,414.

**Bulandshahr**, district of the Meerut division of the United Provinces, India, an alluvial plain lying between the Ganges and the Jumna. Indigo is the main crop; p. 1,100,000.

**Bulandshahr** or **Baran**, town, India, capital of the district of Bulandshahr, 40 m. s.e. of Delhi. It is a place of great antiquity; p. 20,000.

**Bulb**, an underground store of plant nutriment which in a dormant state shows no signs of roots, stems, or leaves, yet when placed under suitable conditions develops all these appendages. Tuber of dahlia, corm of crocus, rhizome of anemone, share with the true bulb of onion or tulip this general name. In the onion or hyacinth, the area of storage becomes clearly marked off, and in autumn the vegetative portion of the leaf dies away, leaving the successive leaf-bases overlapping each other around the excessively shortened disk-like axis. In a true bulb, such as that of a tulip, almost the whole substance is composed of a series of overlapping fleshy scales. After the tulip has flowered, it accumulates fresh food material in a new bulb, formed by the development of a bud contained among the scales of the old and now withered bulb of the previous year. In growing bulbous plants great care must be taken that no damage is done to the leaves when flowering is finished, for it is on the activity of these leaves that the next year's flowers depend. Bulb growing is a great Dutch industry. Consult Rockwell, F. F., and Grayson, E. C., *Complete Book of Bulbs* (1953).

**Bulfinch, Charles** (1763-1844), American architect, was born in Boston, Mass. He built the first theatre in New England, the old Federal Street Theatre, Boston (1793), and erected the famous State House in that city

(1795-8), afterward greatly enlarged. In 1818 he was appointed to succeed B. H. Latrobe as architect of the Capitol in Washington, completing the original structure in 1830. He designed also University Hall, Cambridge (1814), the Connecticut State House (now the Hartford City Hall), and the Massachusetts General Hospital. Consult *Life and Letters* by Ellen S. Bulfinch.

**Bulfinch, Thomas** (1796-1867), American author, was born in Boston, Mass. His books, which were written in the intervals of business, include *The Age of Fable* (1855), and *The Age of Chivalry* (1858).

**Bulganin, Nikolai Alexandrovich** (1895- ), Soviet Russian statesman, was born in Nizhni-Novgorod (now Gorki). After joining the Communist Party in 1917, he became Mayor of Moscow (1931-37), USSR Deputy Premier and State Bank Board Chairman (1937-41), Politburo member (1946), full Marshal, Vice Premier and Defense Minister (1947), Premier (1955- ).

**Bulgaria**, a European republic, in the northeastern part of the Balkan Peninsula, created a principality by the Treaty of Berlin in 1878, and declared an independent tsardom in 1908. It has a total area of 42,796 sq. m., and is bounded by Rumania on the n., by Yugoslavia on the w., by Greece on the s. and by the Black Sea and European Turkey on the e. and s.e. The physical aspects of Bulgaria are varied, but the land is for the most part hilly, and the geology is largely that of the Balkans, which traverse the country from east to west. To the n. of this great range is the fertile valley of the Danube, which for a considerable distance forms the boundary line between Bulgaria and Rumania; in the s.e. are the Rhodope mountains, culminating in the imposing summit of Muss Alla, over 9,600 ft. in height, next to Mt. Olympus the loftiest peak in the Balkan Peninsula. Numerous rivers traverse northern Bulgaria to join the Danube; others flow into the Black Sea and the Aegean. Bulgaria is in general characterized by rainy springs; hot, rainless summers; clear, fine autumns; and dry winters of great severity, especially n. of the Balkans, where the temperature sometimes falls to 20° below zero.

Natural Resources are abundant. Forests of fir, oak, beech, pine, willow and poplar cover 29 per cent of the surface, and there are valuable mineral deposits, though lack of capital has prevented the development of the mines to their fullest extent. Coal occurs in large quantities at Pernik and in the vicinity

of Trevna, and lead, manganese, iron, gold, silver, salt, zinc, aluminum, lignite and oil shale are valuable. Practically all the mineral resources are owned by the State. The soil of the country is exceedingly fertile and is adapted for the growing of the various European crops. More than 80 per cent of the timberlands are State-owned.

Agriculture is the occupation of four-fifths of the people. The holdings are from one to six acres and methods of cultivation are primitive. Land is held by the owners in absolute freehold for which a land tax is exacted. The communes hold pastures and woodlands in perpetuity and pay no rent. The chief crops are maize and wheat, the former product being raised principally for home consumption, the latter for export. Tobacco is the most important industrial crop. An important industry especially in Philippopolis, is the growing of mulberry trees for silk-worm culture. In 1930, the production was 2,330 tons of silk cocoons. Rose culture for the production of attar of roses is also of importance, (see ATTAR OF ROSES).

The manufacturing industry is still young, but is being vigorously stimulated by the government. The chief industries in order of importance are the preparation of tobacco leaf, flour-milling, textile weaving, ceramics (brick and tile), and the making of cement, metals, sugar, paper and leather. There are many home industries. Bulgarian railways and ports are managed by the Minister of Posts and Railways. The total railway mileage in 1938 was 2,040 m. There are 8 ports on the Black Sea and 10 on the Danube River. River navigation by the Danube system is important. The Simplon-Orient Express provides an outlet to Yugoslavia and Turkey. To neither Rumania nor Greece does Bulgaria have direct railway access, though lines connect Sofia with the European systems. The commerce of Bulgaria follows three main routes—the Black Sea, the Danube, and the mainland railway communication. The population of Bulgaria is 7,160,000, about 87 per cent of Bulgarian origin and 10 per cent Turks. The state religion is that of the Greek Orthodox Church, but the Bulgarian Church has not been included in the Orthodox Communion since 1870. Other faiths are tolerated and the clergy of all religious bodies are paid by the state.

Education is free and compulsory, and is supplied by the state. In addition to elementary schools there are a number of high schools, lower middle schools, and special

schools. There is a state university at Sofia. The government of Bulgaria is that of a constitutional hereditary monarchy. The executive power is vested in a Council of 10 Ministers nominated by the king. The Assembly, *Sobranie*, elected by universal manhood suffrage, is the law-making body, but all its measures require the royal assent. For administrative purposes the country is divided into departments, where local autonomy is practised. The country now known as Bulgaria was originally inhabited by Thracians, and under the Romans formed the province of *Moesia*. The Thracians disappeared before the great Slavonic immigration of the 4th and 5th centuries, and the Slavs were in turn overrun (7th century) by the Bulgars, a Ugro-Finnish people, coming from the banks of the Volga, where the ruins of their ancient capital, Bolgary, still stand. Though fewer in number, the Bulgars rapidly subjugated their Slav predecessors, adopted their language and customs, and at once absorbing and being absorbed, became a great Slav power.

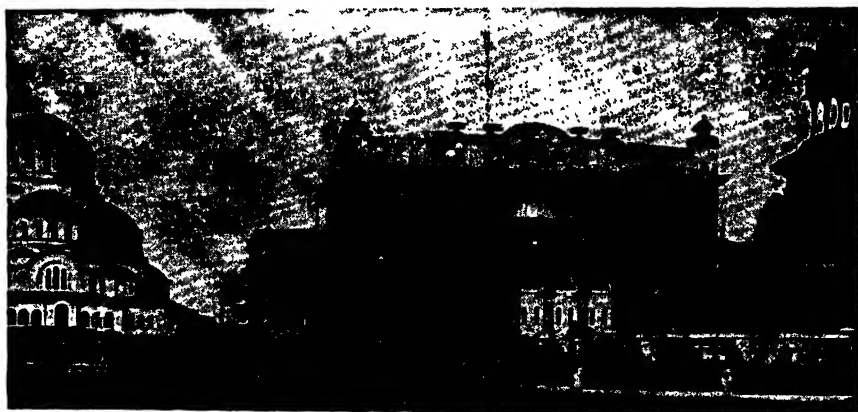
During the 9th and 10th centuries the Bulgarians reached the height of their power, dominating the greater part of the peninsula, including Macedonia, Thessaly, Epirus, and Albania. From the 10th century on, the Bulgarian kingdom was part of the Byzantine and then the Turkish empires. The first national awakening dates from the year 1762, when the monk Paisios, then at Mt. Athos, wrote the national chronicles, and revived memories of ancient glory. A new national literature began; the first Bulgarian school was opened in 1835, and was followed by others. A newspaper appeared in 1844. The story of Bulgaria from that time through the Crimean war, the Russo-Turkish war, and the later Balkan difficulties is too detailed to be even sketched here.

During World War I she joined the Central Powers (Oct. 1915) and crossed the Serbian border. On Sept. 18, 1918, the Allies began a powerful offensive in the Balkans which resulted in the unconditional surrender of Bulgaria and the signing of an armistice at Salonica, on Sept. 29, 1918. On October 4, King Ferdinand abdicated in favor of his son, Crown Prince Boris. Bulgaria had to pay a large indemnity and lost lands to Yugoslavia and Greece. With constant border disputes and in danger of civil war, nevertheless the eight-year period ending in 1931 was remarkable for absence of political scandal and the avoidance of war. In 1928 at the request of Bulgaria, the League of Nations took con-



Copyright 1919 International Film Service.

*Sophia, Bulgaria. Cathedral.*



Copyright 1919 International Film Service.

*Sophia, Bulgaria.*

Left: Church of St. Nicholas. Center: House of Parliament. Right: Statue of a former Tsar.

trol of Bulgaria's finances and arranged a loan of £5,000,000. In a country whose per capita income is but \$60 a year (20% of which goes to pay taxes), the expansion of national production and the maintenance of peace were declared essential. In 1940, Rumania, under pressure from Germany and Hungary, permitted Bulgaria to re-annex Southern Dobruja which Bulgaria had been forced to cede to Rumania in 1913 following the sec-

ond Balkan War. Bulgaria declared war on Germany, Sept. 7, 1944. In 1946 the people dismissed the king and established a republic. In the new government was a President, a Premier, and a National Assembly.

**Bulgarian Language**, an inflected language belonging to the southeastern Slavonic branch of the Indo-European stock, closely allied with Russian. In the course of the centuries that language became greatly modi-

fied, and the Bulgarian speech of today bears but little resemblance to the original. Like the Russian, it lacks the syllabic quantity, and has neither inflection of nouns or comparison of adjectives. The poems of the Slavikovs, of Yavorov, Christoc and Botev, the novels of Karavelov and Vasov, the short stories of Strachimirov, Todorov, Stamatov and Eline-Peline, and the satires of Michaelovsky especially deserve mention. Consult S. Mladenov *Geschichte der bulgarischen Sprache* (1929).

**Bulkheads.** *In tunnelling and excavating*, the vertical partitions of timbers or masonry to keep out water, air, or mud. Such structures may be solid, or provided with doors to give ingress and egress to workmen and materials. *In harbor work*, the sea-walls marking the shore-line. From them project piers and docks. *On shipboard*, steel partitions, both transverse and longitudinal, which divide a vessel into a number of water-tight compartments, and thus lessen the danger of foundering when the ship is breached. In men-of-war the bulkheads are provided with water-tight doors. In twin and triple screw ships each engine often is in a separate compartment, as are also the boilers and the coal-bunkers. *Collision bulkheads* are those nearest the bow and the stern.

**Bulkley, L. Duncan** (1845-1928), American physician, born in New York City. He became attending physician to the N. Y. Skin and Cancer Hospital (1882), consulting physician to the N. Y. Hospital (1894), and dermatologist to other New York institutions. His works include: *Acne and Its Treatment* (1885); *Eczema and Its Management* (1901); *Compendium of Diseases of the Skin* (1912); *Cancer, Its Cause and Treatment* (1915-1917).

**Bull**, an instrument, ordinance, decree, or letter of the Pope. The word is derived from the Latin *bulła*, which means a bubble or capsule of wax enveloping a seal; later it was applied to the seal itself, and then to the document to which the seal gave authority. Bulls are generally named from the first word or words, as the one called *Pastor Æternus* (1870), which proclaims the infallibility of the Pope, by Pius ix. See BRIEF.

**Bull**, an unconscious and amusing blunder in speech, implying an evident contradiction in terms. Consult *Essay on Irish Bulls*, by R. L. Edgeworth and his daughter Maria.

**Bull. See Cattle.**

**Bull, John**, a generic name for the English people, and a personification of what is sup-

posed to be the English type. It takes its origin from an amusing skit by John Arbuthnot, a contemporary of Swift, in his *History of John Bull* (1712). The figure now so familiar in cartoons was developed by the *London Punch*.

**Bull, Ole Bornemann** (1810-80), Norwegian violin virtuoso, was born in Bergen, Norway. He made, in 1834, a musical tour of Italy, followed by similar tours in other countries of Europe, by which he acquired both wealth and fame. He visited the United States in 1843-5. On his return to Bergen, he built a theatre for the presentation of Norse drama. Bull subsequently married (1870) an American lady, his second wife, and lived partly in the United States and partly near Bergen until his death.

**Bullard, Robert Lee** (1861-1947), American military officer, from Alabama. He served in the Spanish War, commanded the 2nd Brigade of the 1st Division of the American Expeditionary Force in France, June to August, 1917, and later in 1917 and in 1918 he commanded the First and then the Second American Armies, taking a prominent part in the second Battle of the Marne. He was decorated by France, Belgium, and Italy. In 1921 he was appointed commander of the Department of the East, retiring in 1925.

**Bullard, William Hannum Grubb** (1866-1927), American navy officer and radio expert, served in the Spanish War and in the Mediterranean during the World War, receiving there the surrender of the Austro-Hungarian navy. In 1927 Admiral Bullard became chairman of the U. S. Radio Commission, where he rendered important service.

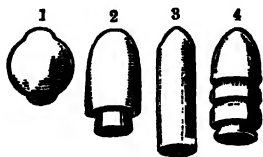
**Bulldog**, a variety of dog, probably of English origin, derived from a cross between a mastiff and some other breed. It was used for many centuries for bull and bear baiting, but at present it is bred mainly as a pet and for show purposes. The average bulldog weighs from 40 to 50 pounds. The points are as follows: Thickset and compact in build; very heavy in front and comparatively light behind; legs strong and short, muscular, and set outside the body; shoulders massive, and standing well out; chest wide and deep; skull large; temples high, with stop well defined; eyes wide apart and black; under jaw wide, projecting, and turned upwards; face short and deeply wrinkled; nose large and black; ears folding over at back showing the underside; bottom teeth projecting at least half an inch in advance of top ones; a good dewlap; back short and roached; ribs well sprung;

fine loin, well tucked up; tail short, kinked, and set on low; coat fine and smooth; action rather slovenly, the hind legs not being lifted high, and the body having a peculiar characteristic swing. The accepted colors are brindle, fawn, red, and solid white, or white pied.

The *French Bulldog* is a small, compactly built dog, differing from the English variety, chiefly in size and in its erect bat-like ears, which give it a singularly alert appearance. *Toy Bulldogs* are small breeds, usually weighing less than 22 pounds, but conforming in other points to the standards for the larger dog. The *Bull Terrier*, of which the so called Boston Bull or Boston Terrier is a familiar example, is the result of a cross between the bulldog and the smooth terrier. It is intelligent, agile, and of great courage. See Amer. Kennel Club, *Complete Dog Book* (1954).

**Bullen, Frank Thomas** (1857-1915), English writer on sea life, was born at Paddington, London. He had but little schooling and was at sea from 1859 to 1883, visiting many parts of the world. His works include *The Cruise of the 'Cachalot'*, with introduction by Kipling (1898); *Idylls of the Sea* (1899); *Men of the Merchant Service* (1900); *With Christ at Sea* (1900); *Deep-sea Plunderings* (1901); *A Sailor Apostle* (1903); *Sea-Wrack* (1903); *From Wheel and Outlook* (1913).

**Bullet**, the solid projectile discharged from any kind of small-arm. Formerly all bullets were spherical, and cast in molds. Now all rifle bullets are elongated, and cut by machinery from rods of lead. The expanding or dilating action of a bullet has been claimed by many inventors; but the British govern-



*Bullets:* 1, Belted. 2, Greener. 3, Delvigne. 4, Minié ball.

ment in 1857 awarded the English gunmaker Greener \$5,000, as the person who had practically solved the difficulty as far back as 1836. In 1841 Delvigne, a French officer, invented the first elongated cylindro-conoidal bullet with a hollow base, which was expanded by the explosion of the charge so that the lead entered the grooves of the rifle. Thus the great difficulty in muzzle-loading with a

bullet of almost the same diameter as that of the barrel was avoided.

When small-bore rifles were adopted, the diameter of the bullet was necessarily much reduced. The modern bullet has a casing of hard metal (usually cupro-nickel) covering a core of antimonius lead. This hard metal envelope cannot be expanded by the explosion of the charge and accordingly the small-bore bullet has no cavity in the base. To force it to take the grooves, it is made to cut its way into them by giving the bullet a slightly larger diameter than that of the barrel through which it will have to travel. The bullet for the Springfield rifle, model 1903 (calibre .300 in.), has a diameter of .308 in. It weighs 150 grains, is  $1\frac{1}{4}$  inches long, and composed of 1 part tin to 25 parts lead, covered with a jacket of cupro-nickel. The powder charge for this bullet is 48-50 grains, which gives it a muzzle velocity of 2,700 ft. per second, and a pressure in the chamber of 49,000 pounds per sq. in. For the prohibition of explosive and expansive bullets, see HAGUE PEACE CONFERENCE.

**Bull-fighting** is the national sport of Spain, but has been introduced into France, where, in spite of the prohibitive laws of the country, it has taken a great hold on the people. The choosing of suitable animals from a large herd is considered excellent sport; agility and courage are required in the highest degree. On the occasion of a bull-fight the processional entry into the arena is one of the chief attractions. Directly the bull is let into the arena, a *banderillero* runs up to it and flourishes a cape before its eyes. He then runs toward the railing, the bull at his heels, and the fight commences. The *banderilleros* throw their bright-colored darts, with streamers attached, into the animals neck. When this has gone on for some time, and the bull is half mad with pain and rage, the *matador* salutes the mayor. He wears a pigtail and carries a bright vermillion cloth called the *muleta*, and a sword. Then ensue the most exciting moments of the fight, ending with the death of the bull at the hands of the *matador*.

**Bullfinch** (*Pyrrhula europæa*), a common and handsome bird, with a red breast, coal-black head and quills, and gray back. It is readily tamed, and is often kept in confinement for its singing, in which it is capable of learning tunes.

**Bullfrog**. The largest of N. American frogs (*Rana catesbiana*), sometimes 8 in. in length. It is green, mottled with brown, and

inhabits warm, sluggish streams and marshes. It is especially numerous along the margins of the Great Lakes, where thousands are annually killed and sent to city markets, the large hind legs, when suitably prepared, forming a delicacy highly esteemed. See Frog.

**Bullhead**, or **Bullpout**. In the United States any of the small catfish of warm, sluggish streams especially the little, long-horned *Amiurus nebulosus* of the Eastern states. See CATFISH.

**Bullinger, Heinrich** (1504-75), Swiss reformer, was born at Bremgarten; became Protestant pastor of Bremgarten in 1529, and of Zürich (1531) in succession to Zwingli, of whose followers he became leader.

**Bullion**, uncoined gold and silver in bars or other masses; the word is also used to distinguish metallic from paper money, and occasionally means coin not allowed to pass, or not current at the place where it is tendered. The word was originally applied to the mint, or the place where precious metals were alloyed and converted into stamped money; derived from the Latin *bullā*, 'a lead stamp.'

**Bullitt, William Christian** (1891- ) the first post-war American Ambassador to the Soviet Union, appointed by President Franklin D. Roosevelt in 1933. Before this he had been entrusted with missions to European governments and had served as American observer at international assemblies. He was Ambassador to France, 1936-41. He wrote *Report to the American People* (1940).

**Bullock, William A.** (1813-67), American inventor, was born at Greenville, N. Y. Before he met his death by an accident while setting up one of his presses, he had devised a self-feeding, perfecting press capable of delivering 12,000 folded papers an hour.

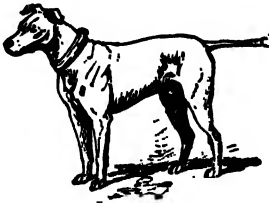
**Bull Run, First Battle of**, a battle of the American Civil War, fought near Bull Run, a small stream in northeastern Virginia, on July 21, 1861, between a Confederate force of about 30,000 (including reinforcements which arrived during the battle) under Gen. Beauregard and Gen. Joseph E. Johnston, and a Federal force of about 29,000 under Gen. McDowell, the latter being decisively defeated. It was the first large battle of the conflict, and both armies were made up for the most part of raw troops, inexperienced in war. McDowell, the aggressor, had wished to delay his movement into Va. until his army should have become better organized but was impelled forward by his government and by public sentiment in the North. He

and Beauregard, by a singular coincidence, had adopted the same plan of battle, each deciding to turn the other's left. McDowell was first in delivering his attack, and for some time the strengthened Federal right prevailed over the weakened Confederate left, Stonewall Jackson, however, standing firm and here earning his sobriquet; but, when a Federal victory seemed assured, a part of Johnston's army, which Gen. Patterson had cunningly allowed to elude him in the Shenandoah Valley, arrived upon the field, the tables were quickly turned, and finally the Federals were forced, in a wild, disorderly retreat, back upon Washington. The loss of the Federals in killed and wounded was about 2,900; that of the Confederates about 1,700. By the Confederates the battle was called the first battle of Manassas—Manassas being the name of a railway junction near the battlefield. Consult Johnston, R. M., *Bull Run* (1913); Freeman, D. S., *Lee's Lieutenants*, vol. 1 (1942); Pratt, Fletcher, *Ordeal by Fire* (1948); Catton, Bruce, *Mr. Lincoln's Army* (1951).

**Bull Run, Second Battle of**, a battle of the American Civil War, fought on nearly the same field as the first battle of the same name, on Aug. 29 and 30, 1862, between about 49,000 Confederates under Gen. Robert E. Lee and about 70,000 Federals under Gen. Pope, the latter being defeated. The Confederates were greatly superior in leadership, Lee being an over-match for Pope, and Lee's two corps commanders, Jackson and Longstreet, giving him more efficient support than Pope's corps commanders, of whom McDowell was the foremost, gave to him. The Federal loss in killed and wounded was about 14,500; that of the Confederates about 9,500. Out of Porter's conduct on the 29th arose the famous 'Fitz John Porter Case.' By the Confederates the battle was called the second battle of Manassas. Consult Freeman, D. S., *Lee's Lieutenants*, vol. 2 (1943). See also references under BULL RUN, FIRST BATTLE OF.

**Bull-terrier**. A dog of English origin, whose breeding has been carried to great perfection. It has great courage, and delights in fighting vermin; but to its master is of a gentle temperament, and this has made it a favorite everywhere. Points—Head long and wedge-shaped, level as possible from skull to head of nose; jaw strong; mouth level; eyes small, dark, and not too prominent; chest broad; body short and well ribbed up; fore legs medium length, showing plenty of

bone and muscle; feet strong and well arched; hind legs well hocked; tail fine and straight, carried in line with back when not excited (if excited, game dogs will get them up); coat fine, short, and smooth. As to color, pure white, with a black nose or eye, is most approved.



*Bull-Terrier.*

**Bull Trout, or Gray Trout** (*Salmo cambricus*), a fish allied to the salmon, common in many British waters. The name is also given to other related fish, as, in the Rocky Mountains, to the Dolly-Varden trout.

**Bulnes, Manuel** (1799-1866), Chilian soldier, was born in Concepcion, and at sixteen was active in the movement for Chilian independence. He was made lieutenant-general, and was elected president of Chile in 1841, and re-elected in 1846.

**Bülow, Bernhard Henry Martin Charles, Prince von** (1849-1929), imperial chancellor of the German empire, was born at Klein Flottbeck, Holstein. In 1873 he entered the diplomatic service, and in 1878 was secretary of the Berlin Congress. In 1900 he was made chancellor of the German empire and Prime Minister of Prussia, succeeding Prince Hohenlohe.

**Bülow, Hans Guido von** (1830-94), German pianist and conductor, born at Dresden; adopted the theories of Wagner, under whose guidance he placed himself, and, having completed his training under Liszt, made his first concert tour in 1853. He made two concert tours to the U. S. His editions of Beethoven and other masters of the pianoforte are of high value.

**Bulrush.** The true bulrush (*Scirpus lacustris*) is European. An American species is very like and found in the Western states, where it is known as tule, and is a valuable fibre and food plant for the aborigines. The plant is four feet or more in height, the stems are terete, and the leaves are flat or ribbon-shaped. The cat-tail (*Typha latifolia*) is often called the bulrush. The stem of this handsome plant is often seven ft. in height and

in July culminates in a brownish cylinder of pistillate flowers, this again being crowned with a thin spike of male flowers.



*A, Bulrush (1, flower). B, Great reed-mace (1, male flower; 2, female).*

**Bulwer, William Henry Lytton Earle, Baron Dalling and Bulwer** (1801-72), English diplomat known as Sir Henry Bulwer, and elder brother of Lord Lytton, was born in London. In 1849 and 1852 he was minister at Washington, where, in 1850, he negotiated the Bulwer-Clayton treaty. Bulwer was very popular, had a great reputation as a diplomatist, and achieved some distinction as the author of two volumes (1867-70) of *Historical Characters* (Talleyrand, Cobbett, Canning, and Mackintosh), and a *Life of Viscount Palmerston* (1870).

**Bulwer-Lytton, Sir Edward.** See **Lytton**.

**Bumblebee, or Humblebee.** See **Bees**.

**Bumboat,** a wide, flat boat used in Holland. The name is also applied to the boats

of small traders who sell provisions, clothing, etc., to vessels lying in roadsteads.

**Bumpus, Hermon Carey** (1862-1943), Am. educator, was born at Buckfield, Me. In 1902 Dr. Bumpus was made director of the American Museum of Natural History in New York. He published *A Laboratory Course in Invertebrate Zoology* (1893).

**Buna S**, most promising of the rubber substitutes; made of hydrocarbon butadiene and the aromatic coal-tar derivative styrene.

**Bunche, Ralph Johnson** (1904- ), Am. Negro educator and diplomat, b. Detroit, Mich.; ed. Harvard; prof. polit. sci., Howard Univ., 1938-1952; U.N. mediator in Palestine, 1948-49; won Nobel Peace Prize, 1950; Undersecretary for U.N., 1954-.

**Buncombe**, empty speech-making, tall-talk oratory intended to gull rather than to enlighten. The word is derived from Buncombe, a county of N. C. Near the close of a debate on the Missouri question in the 16th Congress, the representative from the county delivered a long speech, saying that he was 'speaking for Buncombe.'

**Bund, German-American**. A Nazi-front organization that arose in the 1930's.

**Bundesrat**, the federal council of the German empire, consisting of 58 delegates appointed by the governments of the individual states for each session. It was superseded after World War I by the Reichsrat.

**Bundi**, feudatory state in Rajputana, India. Area, 2,205 sq. m.; p. 249,374—**BUNDI**, the chief town, is 95 m. s.e. of Ajmere; p. 17,991.

**Bunin, Ivan Alexeyevich** (1870-1953), Russian poet and novelist, was born of noble family in Voronezh. His poetry is mainly descriptive. Included among his prose writings, for which he ranks highest, are *A Gentleman from San Francisco* and *The Village*. He was awarded the Nobel prize for literature in 1933; pub. *Memories and Portraits*, 1951.

**Bunion**, a swelling, generally of the bursa at the base of the great toe. Gout, or the rheumatic constitution, may predispose to it; but the exciting cause is always ill-fitting footgear, causing abnormal pressure on the joint. Chronic inflammation is set up, and perhaps a false bursa is formed over the joint.

**Bunker Hill, Battle of**, a battle fought chiefly on Breed's Hill, Charlestown, Mass., on June 17, 1775, during the American Revolution, between about 1,500 Americans entrenched, under Prescott and Putnam, and an attacking force of about 2,500 British under Sir William Howe, the Americans, after

repelling two attacks and exhausting their supply of powder, being driven from their position. Bunker Hill Monument, a granite obelisk 221 ft. in height (1825-43), stands on Breed's Hill, which is now known as Bunker Hill. Consult Ward, C. L., *The War of the Revolution*, vol. 1 (1952).

**Bunner, Henry Cuyler** (1855-96), American author, was born in Oswego, N. Y. After working as a reporter, he was in 1877 made assistant editor of *Puck* on its establishment, and shortly after he became editor, holding the position until his death.

**Bunsen, Robert Wilhelm** (1811-99), German chemist, was born in Göttingen. He held four chairs—at Kassel in 1836; Marburg, 1838; Breslau, 1851; and Heidelberg, 1852-89. He laid the foundations of modern organic chemistry. In the course of his researches he invented the battery, burner, grease-pot photometer, filter pump, ice and vapor calorimeters that are associated with his name and in use in every laboratory throughout the world.

**Bunsen Burner**. In this appliance a jet of coal gas is directed into a tube which is open at both ends, and usually vertical. As a result air is drawn in by the current of gas, and mixes with it, so that, when ignited at the top of the tube, the mixture burns with a very hot, non-luminous flame. Bunsen burners are used for heating by gas, both for technical and domestic purposes.

**Bunsen Cell**. See *Cell, Voltaic*.

**Bunter**, in geology the lowermost subdivision of the Triassic or New Red Sandstone, so called from a German word meaning 'variegated.' It consists of mottled red sandstones and breccias, with interpolated pebble beds.

**Bunting**, a term properly applied to birds belonging to the family Emberizidae. They are related to finches, and are robust, with thick beaks, and confined to the Old World; but several of the larger American finches more or less related, are styled 'buntings.'

**Bunting, Jabez** (1779-1858), 'second founder of Methodism,' was a Manchester tailor's son. In London he filled the highest posts in his denomination, and transformed the Methodist Society into a self-governing church, over which he exercised great authority. His chief interest was in the Wesleyan missions. See *Life* by T. P. Bunting (1859).

**Bunyan, John** (1638-88), author of the *Pilgrim's Progress*, was born at Elstow, Bedfordshire, England. Bunyan's early youth. ac-



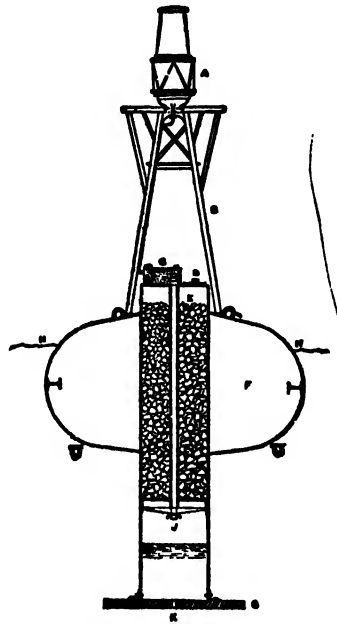
ording to his own account, was notoriously ungodly; but although he fought for a few months as a soldier in the Parliamentary army, his marriage to a young woman of religious character when he was only nineteen, his subsequent baptism and admission to 'church privileges,' and the fact that his *Sighs from Hell* (a record of spiritual struggle) appeared when he was just two-and-twenty, all point to his having abandoned his evil ways at the very outset of his career. Bunyan soon began (1655) to preach in the villages, and in 1656 he wrote his *Gospel Truths Opened* and *A Vindication* of it (1657), both directed against the Quakers; and at the assizes in the following year an indictment was preferred against him for preaching at Elstow. Although for the time he escaped punishment, soon after the restoration he was convicted (Nov., 1660) as 'a common upholder of several unlawful meetings and conventicles,' and was committed to Bedford jail, where he remained for 12 years, till 1672. During his imprisonment he wrote the first part of his immortal allegory, the *Pilgrim's Progress* (1677); In 1671, the year before his release, Bunyan was elected pastor of the Baptist church at Bedford.

A full list of Bunyan's works was given in Charles Doe's *Catalogue Table* (1691). One of the most carefully collected editions is that entitled *The Works of John Bunyan, with an Introduction, Notes, and Sketch of his Life and Contemporaries*, by George Offor (3 vols. 1862). George Whitefield published an edition of the works in 1767, and Mason's edition, with notes, appeared in 1785. Southey's edition (1830) is one of the best, and his *Life of Bunyan* still holds its place.

**Bunzlau**, tn., prov. Silesia, Prussia, 24 m. w. of Liegnitz; famous for its brown pottery ware. Birthplace (1597) of the poet Opitz; p. 19,000.

**Buoy** (Du. *boei*), a floating object designed to mark:—the limit of a channel; the position of a rock, shoal, or other danger to navigation; the position of an anchor, or of a telegraph cable; or the limit of an anchorage, dumping, or quarantine ground. A buoy is also used to support the end of a permanent mooring, the ship making fast to the buoy directly or to the end of the mooring chain beneath the buoy. In the United States the buoyage of harbors, channels, shoals, etc., is controlled by the Lighthouse Board. In approaching a harbor or an anchorage from seaward, a bell or whistling buoy usually

marks the outer end of the channel; black buoys with odd numbers will be found on the port edge of the channel, and red buoys with even numbers will be found on the starboard edge. Buoys with vertical stripes of black and white are placed in mid-channel, and must be passed close to avoid danger. Danger buoys, marking outlying rocks or shoals,



*Automatic Acetylene Buoy.*

A, lantern; B, tower; C, purifier; D, recharging door; E, carbide chamber; F, air flotation chamber; G, ballasting counterweight; H, water line; J, water-inlet valve; K, water port.

have horizontal stripes of black and red. Buoys marking submerged wrecks are green; those marking anchorage grounds are white; and quarantine buoys are yellow. The United States is almost the only country having a uniform system of buoyage.

**Acetylene Gas Buoy.**—A great improvement in gas-lighted buoys became possible with the invention of a commercial process for the production of calcium carbide, from which acetylene gas is made by the simple addition of water. The brilliancy and penetrating power of the acetylene light renders it especially valuable for marine lighting. The

Willson buoy, invented by T. L. Willson, inventor of the commercial carbide process, has come widely into use. It generates its own gas at the low pressure of about six pounds to the sq. in., and with one full charge of carbide, varying from 1,300 to 3,500 lbs., according to the size of the buoy, gives a continuous light for from six to nine months without attention.

**Buprestis**, a genus of beetles whose members are remarkable for the metallic brilliancy of their coloring, especially in the case of tropical forms.

**Burbank, Luther** (1849-1926), American horticulturist, was born at Lancaster, Mass., son of a farmer and manufacturer. After working as a wood turner and pattern maker at Worcester, he devoted himself to horticulture. He bought a farm at Lunenburg, Mass., and began his experiments with fruits, flowers and vegetables, and while there developed the well-known Burbank potato. In 1875 he removed to Santa Rosa, Cal., believing that climatic and soil conditions in that region offered greater promise for the execution of his purpose. In 1904 the Carnegie Institution unanimously voted him \$10,000 per annum for ten years, to enable him to prosecute his experiments without concern for his financial necessities. In 1893 he issued a modestly worded publication, *New Creations in Fruit and Flowers*, and supplemented it with others in which he described and pictured many of his achievements. These publications elicited widespread and very diverse comment.

In an appreciative review of his work, Dr. Edward J. Wickson, professor of agricultural practice at the University of California, thus summarized Mr. Burbank's accomplishments:

(1) Varieties have been secured which are prolific where the older sorts have proved unsatisfactory; (2) varieties have been produced which, by early and late ripening, prolong the fruit season three or four months; (3) varieties have been produced which show almost incredible precocity in bearing fruit; (4) surprising changes in the natural structure of fruits have been secured, the most notable of which perhaps is the elimination of the shell inclosing the kernel in what is called stone fruits; (5) the ranges of flavor and aroma in several fruits have been enriched and extended; (6) radical changes in form or color have also wrought havoc with old forms of speech, as 'plum-colored' and 'plum-shaped,' that fruit in form having entered the domain of the apple and tomato, and the conventional form

of the pear has been inverted; (7) the foregoing results have been obtained by selection and by crossing within the limits of species and variety. Professor Wickson also stated that still more surprising achievements had been reached by crossing fruits which belonged to genera heretofore supposed to be hedged about by impassable barriers.

The space allotted for this article will permit only a brief reference to his most important achievements. From a half hardy plant found in west central Australia he developed the 'Australian star flower.' His popular 'Shasta daisy,' which he bred on a colossal scale, was developed by crossing the common field daisy of the East with a daisy from Europe and another from Japan. In the line of fruits Mr. Burbank achieved as distinct triumphs as in that of flowers. Foremost among his creations were the stoneless plum, produced by crossing the *prunier sans noyau*, a fruit that had been known for a hundred years as a curiosity, with the French prunes and other prunes, and the plum-cot, an entirely new fruit, obtained by the crossing of plums and apricots. The peach almond is a hybrid of the Wager peach and the Langue doc almond; the Pineapple quince is a luscious fruit combining the qualities of each of its parents; the blueberry is the eastern variety improved in California soil; and the white blackberry is what Wickson called 'one of Mr. Burbank's most startling achievements.' To these should be added some new varieties of grapes, originating from the Isabella Regia of California growth, a large black grape. Two developments from this are a white, seedless fruit, ripening early in the season, and another which ripens about the holidays.

The narrative of the evolution of the thornless cactus is thus told by its creator (1908): 'Twelve years ago I became impressed with the possibilities of the *opuntia cactus*, or prickly pear, as a forage plant, if only the spines and bristles could be done away with. I had specimens sent to me from all over the world, and by selecting and crossing, raising year after year thousands of new seedlings only to be destroyed as unavailing, I at last was rewarded in creating a variety absolutely without spines or bristles. I have half a dozen other spineless varieties, and they were all put on the market for the first time last summer.'

**Burbot**. The only species of fresh-water cod (*Lota lota*), which inhabits some of the rivers of North Europe, and sometimes has a

weight of 12 lbs. An American representative (*L. maculosa*) is numerous in the Great Lakes and in the northeast United States.

**Burckhardt, Jakob** (1818-97), Swiss historian of art, born at Basel; in 1850 he became professor of art history at the University of Basel. His principal work is *The Cicerone or Art Guide to Painting in Italy* (1855, Eng. trans.), which became a classic because of its clear and useful descriptions, dealing with sculpture and architecture as well as painting.



*Luther Burbank.*

**Burckhardt, John Lewis** (1784-1817), Eastern traveller, was born at Lausanne, Switzerland. He wrote *Travels in Nubia* (1819); *Travels in Arabia* (1829); *Notes on the Bedouins and Wahabys* (1830); *Arabic Proverbs* (1830).

**Burdekin River**, Queensland, Australia, rises in Sea View range, flows by Charters Towers and Ravenswood gold fields, and falls into the Pacific Ocean at Upstart Bay.

**Burden**, the term formerly applied to the tonnage measurement of a ship. See **TONNAGE**.

**Burdette, Robert Jones** (1844-1914), American humorist, born at Greensborough, Pa. He worked on Peoria newspapers for

some years; in later years a member of the staff of the Brooklyn *Eagle*. His books include *Hawkeye* (1880); *Chimes from a Jester's Bells* (1897); *Smiles Yoked with Sighs* (1900).

**Burdick, Francis Marion** (1845-1920), American lawyer, educator, and editor, born in De Ruyter, N. Y. He was an editor of the *American Year Book*, in charge of the Department of Law and Jurisprudence as the appointed representative of the American Bar Association. Among his books are: *Law of Sales* (1901); *Essentials of Business Law* (1902).

**Burdock** (*Arctium Lappa*), a coarse plant of the compositæ, common in temperate regions of the Old World, and naturalized in America. The flower head, a 'bur,' is covered with small hooks, and readily attaches itself to any passing body, thus securing wide distribution of the seeds.

**Bureaucracy** is a term applied to the highly centralized forms of administration in which the officials of a department or bureau are responsible to their administrative superiors only, and are not amenable, in their official capacity, to the common law of the land. See **United States, New Deal**.

**Bureau of American Ethnology**. See **Smithsonian Institution**.

**Bureau of American Republics**. See **Pan American Union**.

**Bureau of Corporations**. The act of Congress of 1903, creating the Department of Commerce and Labor, established under that department a Bureau of Corporations, to be presided over by a Commissioner of Corporations, charged with the duty of making inquiries into the business of corporations engaged in inter-State and foreign trade, with a view to securing information upon which the President might base recommendations for legislation regulating such corporations. The Bureau of Corporations was given the power to subpoena and compel the attendance of witnesses, to examine the books of a corporation, and otherwise to secure the information sought. The Bureau was absorbed by the Federal Trade Commission in 1914, and separated from the Department of Commerce and Labor.

**Bureau of Lighthouses**, created in 1910 to take the place of the Lighthouse Board, is a bureau of the Department of Commerce. It has charge of the construction and maintenance of lighthouses and lighthouse vessels, signals, and buoys, and generally of the lighthouse service; also custody of the archives,

apparatus, etc., appertaining to that service.

**Bureau of Mines.** The National Bureau of Mines for the United States was established by act of Congress approved May 16, and effective July 1, 1910. The chief purpose of the Bureau is to carry on inquiries and investigations with the view of lessening loss of life and waste of resources in mining and metallurgical operations. The Bureau is to make investigations of the methods of mining, especially in relation to the safety of miners; the appliances best adapted to prevent mine accidents; the improvement of mining conditions; the treatment of ores and other mineral substances; as to the use of explosives and electricity in mining and other inquiries and technologic investigations pertaining to mining, metallurgical, and quarry industries. The act also transferred to the Bureau of Mines the personnel and equipment of the technologic branch of the U. S. Geological Survey. This personnel and equipment were developed during the preceding five years in connection with the investigation of fuels and mine accidents, and the new Bureau is to continue similar investigations. The Bureau engages in helium research, and in its plant at Fort Worth, Texas, produces the helium required for the military air services.

**Burgee**, the distinguishing pennant of a yacht club, is a V-shaped pennant, with the point away from the staff.

**Burgess.** In medieval England the term burgess signified a freeholder in a chartered town. Only burgesses could participate in the municipal government, and they came to be practically an oligarchic governing body, perpetuating itself by hereditary succession, or by co-optation. In American colonial history the term was used usually in its original sense as citizen of a town, and is still thus used in parts of New England. In colonial Virginia, however, the term is found in the sense of a member of a legislative body, in the 'House of Burgesses,' the colonial legislature. In England, since 1835, the municipal electors of a borough are the burgesses.

**Burgess, Edward** (1848-1901), American yacht designer, was born at West Sandwich, Mass. He began, with his brother, Sidney Burgess, the business of yacht designing at Boston in 1883, and received his first order for a yacht to defend the *America's* cup in the spring of 1885. He designed the *Puritan*, a centreboard yacht, which beat the English *Genesta*. He repeated the experience in 1886 with the *Mayflower*, which won a victory over the *Galatea*, and again in 1887 with the

*Volunteer*. This was an unprecedented record.

**Burgess, Golett** (1866-1951), American humorist and illustrator, was born in Boston, Mass., and was graduated from M.I.T. His publications include "The Purple Cow" (1897); *Goops and How to Be Them* (1900); *Are You a Bromide?* (1907); *Why Men Hate Women* (1927); *Ladies in Boxes* (1942).

**Burgess, Frederick** (1853-1925), American P. E. prelate, born in Providence, R. I. He assumed charge of Grace Church, Brooklyn Heights, N. Y., in 1898, and four years later, on the death of Bishop Littlejohn, he was consecrated bishop of Long Island.

**Burgess, George** (1809-66), American P. E. prelate, elder brother of Alexander, was born in Providence, R. I., and graduated (1826) at Brown. He was consecrated first bishop of the diocese of Maine, making his residence at Gardiner in that state.

**Burgess, Neil** (1846-1910), American actor, born in Boston, Mass. In 1889 Mr. Burgess produced Charles Barnard's comedy, *The County Fair*, at Philadelphia, which afterward ran for more than two years at the New York theatres. See Clapp and Edgett's *Players of the Present* (1899).

**Burgess, Thornton Waldo** (1874- ), American author, was born in Sandwich, Mass. He wrote children's stories of birds, animals and flowers. *The Burgess Bedtime Stories* have appeared in many newspapers.

**Burglary.** The breaking and entering a dwelling house in the night time with intent to commit larceny or any other felony. The breaking may be either actual (e. g. forcing open a closed window or door) or constructive (e. g. gaining admission by conspiracy with a servant). The entering must be actual, but it need not be an entry of the whole person. If the felonious intent is lacking the act of breaking and entering is only a trespass, and if the act is committed by daylight it is, notwithstanding the felonious intent, only housebreaking. The heinous character of the offence has rendered burglary severely punishable by the law of all civilized states. In England the penalty is penal servitude for life or for a long period of years, and in this country for varying terms of imprisonment, extending to 20 years.

**Burgomaster**, the chief magistrate in Belgian, Dutch, German, and Austro-Hungarian towns. His duties are similar to those of mayors and provosts in Great Britain, and of *maires* in France.

**Burgos.** (1) Province, N. Spain, lying between Alava and Navarre. On the whole

the province is mountainous, but especially in the n. and n.e. Area, 5,650 sq. m.; p. 403, 386. (2) City, cap. of above prov., on river Arlanzon. It is 142 m. from Madrid, is a very ancient city, whose principal glory now is its superb Gothic cathedral (1221), which is one of the noblest in the world; p. 78,929.

**Burgoyne, John** (1722-92), English soldier and dramatist. He is best remembered for his service in the American Revolution. With Generals Howe and Clinton he joined Gen. Gage in Boston early in 1775, and in 1777, with the rank of lieutenant-general, he commanded the famous expedition sent from Canada to form a junction at Albany with Sir William Howe (then at New York), and to capture as he went the 'American posts which lay upon Lake Champlain.' He reached Crown Point (June 27) and forced the evacuation of Ticonderoga (July 6). Unable to secure provisions in sufficient quantities, unsupported by expected reinforcements from New York, and confronted by a strong American army, he was forced to surrender to Gen. Gates at Saratoga (Oct. 17) after fighting two stubborn battles (Sept. 19 and Oct. 7). (See SARATOGA, BATTLES OF.) He was commander-in-chief in Ireland (1782-4). He wrote several dramas and *The Heiress* (1786), described by Horace Walpole as one of the most pleasing English compositions and long popular. See his *Works* (2 vols., 1808); and Stone's *Campaign of Lieut.-Gen. Burgoyne* (1877).

**Burgoyne, Sir John Fox** (1782-1871), English military engineer, natural son of the above, rendered important services while commanding the engineers in Portugal (1809-13), and as virtual second in command in the Crimean War. For his Crimean work Burgoyne was assailed by the press, but later became a popular hero, and was made baronet and field-marshal.

**Burgrave, or Burggrave**, a title frequently borne in the middle ages by the military commandant of a German town.

**Burgundii**, a powerful German tribe whose original home was between the Oder and the Vistula; they were of the same race as the Vandals. Early in the 5th century A.D. the usurper Jovinus invited them to settle on the left bank of the Rhine; hence arose the duchy and county of Burgundy.

**Burgundy** (Fr. *Bourgogne*), former province of France, now forming all or part of the départements Ain, Aube, Côte-d'Or, Haute Marne, Nièvre, Saône-et-Loire, and Yonne. The struggle for supremacy in France between the Burgundians, the French, and the English

fills an important chapter of mediæval history. In 1477, on the death of its last duke, Charles the Bold, Burgundy was attached to the crown of France. The name is now mainly associated with the wine of the province.

**Burgundy Pitch** is prepared by melting and straining the exudation from the stem of the spruce fir of Southern Europe. It is hard, brittle, reddish brown and opaque, sweet and aromatic.

**Burhanpur**, tn., Nimar dist., Central Provinces, India, 95 m. s.e. of Indore; was the seat of the Deccan princes of the Mogul empire until 1635; was taken by General Wellesley in 1803; and in 1860 became British territory; p. 53,987.

**Burial**. The usual mode of disposing of the bodies of the dead by inhumation or burying in the earth. The earliest legal regulation of burials in our system of law is connected with the exclusion from consecrated ground of the bodies of such as had incurred ecclesiastical censure. By the English law every baptized person not a suicide, excommunicate, or a person upon whom the sentence of death has been executed, is entitled to be buried in the churchyard of his parish by a Church of England clergyman, without fee. In the United States the burial of the dead is a civil and not an ecclesiastical function, and all persons, except such as have suffered capital punishment, are entitled to decent burial in a public or private cemetery. Overseers and guardians of the poor must bury a pauper if no one else is liable to do so, and it is generally a misdemeanor to bury or otherwise put out of the way a dead body without first procuring a certificate of death from a licensed physician or, in case of sudden death, without the authority of the coroner. See CEMETERY, CORPSE, CORONER.

**Burial Customs**. Although burial strictly means interment, or, at any rate, conveys the idea of covering over, a brief mention may here be made of the various modes of disposing of the dead, whether under ground or otherwise. Probably the method still followed by many American Indians, by some tribes of Eskimos, and by the Tibetans, as described by Sven Hedin, was that first practised by man—*viz.* carrying the corpse a short distance from the encampment, and there depositing it on the surface or upon a platform where it is soon dismembered by birds and animals. The Hindu practice of committing the dead to the waters of the sacred Ganges had probably a like origin, although latterly accompanied by the most reverent rites. The

same may be said of burial at sea, which, in certain phases, was nothing more than the getting rid of a corpse by tossing it overboard, but which, as practised nowadays, is a solemn and devout ceremony. Akin to these is the Malay usage, by which a man, recognizing the near approach of death, puts out in his boat alone to sea; which bears some resemblance to the Viking (man of Vlk, or Scandinavian sea-rover) practice of putting a corpse aboard a ship which was set on fire,

mound-dwelling as before. (See Lord Avebury's *Prehistoric Times*, 1900, pp. 124-129.) Among primitive nations it was often the custom to place beside the corpse his weapons and utensils, for use in the other world; and in the case of a chief, his wives, slaves, and steed were killed at his grave, that they might bear him company, and serve him as in this life. As a rule, corpses are and have been buried lying at full length; but in many early European and in modern Eskimo interments



*Egyptian Funeral Ceremonies.*

(By permission from the large facsimile sheets of the 'Book of the Dead,' published by the Department of Oriental Antiquities, British Museum.)

The upper part shows the mummy on a boat-shaped hearse drawn by oxen, the wife kneeling beside it, and a priest officiating in front. In the lower part the mummy is supported upright in front of the tomb by Anubis, the wife again kneeling; priests officiate at a table of offerings—one reads the funeral service, and one brings forward an offering; behind are mourners. The cow and calf symbolize the Rising Sun, and Heaven.

though the more usual custom was to bury it under the warrior's ship, or to build a mound over it on some sea headland. Cremation, once more coming into vogue, was formerly a widespread practice, and urns containing incinerated remains are frequently disinterred in many parts of Europe. Burial in the earth, in mounds, and in stone vaults has been, and with little variation still is, the most usual European form of sepulture. In the Aleutian Isles it was customary to close merely that compartment which has been the dead man's special retreat, while his kinsfolk continued to inhabit the other parts of the

body is doubled up. Embalming for purposes of preservation was the process adopted by the ancient Egyptians, and in a modified form it persists to the present day. *Endo-Cannibalism* (see CANNIBALISM) may also be regarded as a burial custom. See *Archeology, Barrows, and Mounds*.

**Buriats**, a Mongol race inhabiting the district round Lake Baikal, Transbaikalia, and the south of government of Irkutsk, in Siberia. Originally nomads, they are now in part successful agriculturists.

**Buridan, Jean**, a French philosopher of the 14th century, became rector of the Uni-

versity of Paris (1327). He was one of the most subtle dialecticians of his age, and his works consist of commentaries on Aristotle (1447-9 and 1518). His works were published by J. Dullard in 1516.

**Buriti, or Miriti, Palm** (*Mauritia flexuosa* or *vinifera*), two of the largest South American fan palms (100-125 ft. high), growing on swampy land from Brazil to the West Indies. From the sap the natives obtain, by fermentation, an intoxicating liquor.

**Burke, Billie** (1886- ) actress, born at Washington, D. C. She made her debut as singer in London in 1902 and in 1907 was leading woman in *Mr. George*. The same year she starred with John Drew in *My Wife*. Other plays in which she has starred include *Cesar's Wife*, (1919); *The Marquise* (1927); and *Vinegar Tree* (1931). She has appeared often on the screen.

**Burke, Edmund** (1729-97), English statesman and political philosopher, was born in Dublin. In 1757 appeared *An Account of the European Settlements in America*, written by Burke with the assistance of his cousin, William Burke. This work shows his early interest in America, and reveals his knowledge of the conditions in the colonies at that time. When in 1759 Dodsley founded the *Annual Register*, Burke, to whom the plan of the book was due, became its editor, and continued a contributor until 1788. Burke's public life now began. Lord Rockingham was called to the Premiership in 1765, and Burke became his private secretary. His sane and generous views on the rebellion of the American Colonies, and the disastrous policy of the ministry of Lord North, 1770-82, found expression in his speeches on *American Taxation*, 1774, and on *Conciliation with America*, 1775, also in the *Letter to the Sheriffs of Bristol*, 1777. In their union of sound statesmanship and lasting political wisdom these treatises form 'the most perfect manual in our literature for one who approaches the study of public affairs.' Burke in 1780 brought forward his *Plan of Economical Reform*, designed to check extravagance in the administrative departments. His eloquent speech on the East India Bill was the prelude to his great crusade against the abuses of the East India Company. The same reverence for established faiths and institutions urged him to write *Reflections on the French Revolution* (1790). The publication of the *Reflections* proved to be an event of European importance, but in the Whig party it created a painful division, which was accentuated by the

*Appeal from the New to the Old Whigs*, 1792. Burke broke off his friendship with Fox, and severed the political ties of a lifetime, but he carried with him a number of the Whigs. In retiring from Parliament in 1794 he was granted pensions amounting to \$18,500 a year, which his lifelong pecuniary troubles made welcome. He died on July 8, 1797, and was buried at Beaconsfield, in Buckinghamshire. Burke ranks as one of the foremost orators and political thinkers of England. Burke's *Collected Works* have been published in numerous editions. Consult Morley, John, *Edmund Burke* (repr. 1924).

**Burke, Sir John Bernard** (1814-92), English genealogist, was born in London. He edited for many years, in succession to his father, the annual issue of *Burke's Peerage*.

**Burke, Maurice Francis** (1845-1923), American Roman Catholic bishop, born in Ireland, and educated in Chicago and in Rome, Italy. He was consecrated bishop of Cheyenne, Wyo., in 1887.

**Burke, Thomas Martin Aloysius** (1840-1915), American Roman Catholic prelate, born in County Mayo, Ireland, and was brought as a child to Utica, N. Y. He was consecrated bishop of Albany in 1894. He was also vicar-general of the diocese in 1887-94.

**Burke, Thomas Nicholas** (1830-83), popularly known as 'Father Tom,' Irish Roman Catholic preacher, was born in Galway. He preached in Ireland, the United States, England, and Italy. His lectures in reply to Froude were published as *English Misrule in Ireland*. Consult Fitzpatrick's *Life*.

**Burke, William** (1792-1829), the accomplice of William Hare in a series of infamous murders, was born in Orrery, County Cork, Ireland. Burke and Hare were arrested; the latter turned king's evidence, and Burke was executed.

**Burleigh, or Burghley, William Cecil, Lord** (1520-98), English statesman, was born in Bourne, Lincolnshire, the son of a wealthy squire. In 1550 he was appointed secretary of state, and shortly afterward knighted. On the accession of Queen Elizabeth, he was appointed chief secretary of state; and from 1558 till his death he practically guided the destinies of England. It was largely owing to Burleigh that the age of Elizabeth became so illustrious in history. In 1560 Burleigh went to Scotland as commissioner to end the war. He was created Baron Burghley in 1571, and Lord High Treasurer, 1572, which post he held until his death. He was buried in West-

minster Abbey. Consult *Burghley Papers*, edited by Murdin; Macaulay's *Essay*; Nare's *Memoirs of Lord Burghley*.

**Burleson, Albert Sidney** (1863-1937), American Cabinet officer, born San Marcos, Tex. He was a member of the House of Representatives from the 56th to the 62d Congress and was appointed Postmaster-General in President Wilson's Cabinet.

**Burlesque**, a composition treated in a way to excite laughter. Its favorite method is to set forth its subject in a ludicrous light, by emphasizing its incongruities, its oddities, its inconsistencies. Although pure burlesque originated in the time of Aristophanes, modern burlesque, so called, was an Italian invention—its two greatest exponents, Berni and Gozzi. Among the best of English burlesques, far behind those of Italy, are Chaucer's *Rime of Sir Thopas*, Beaumont and Fletcher's *Knight of the Burning Pestle*. Scarron is perhaps the most distinguished French writer in this vein, and Cervantes, of Spain, is the author of what is probably the best burlesque ever written, *Don Quixote*. There is a distinct note of burlesque in the comic operas of W. S. Gilbert and in more recent productions as George S. Kaufman's *Of Thee I Sing*. Consult Hamilton's excellent collection of *Parodies*.

**Burlingame, Anson** (1820-70), American diplomatist, was born in New Berlin, N. Y. He was sent by Abraham Lincoln to China as U. S. minister, 1861; and on his return, 1867, Prince Kung, regent of the empire, requested him to act as special Chinese envoy to the United States and the great European powers. His success was marked by the treaty, 1868, with the United States in which China first officially accepted the principles of international law and by similar treaties with Great Britain, Prussia, Denmark, Sweden, and Holland.

**Burlington**, city, Iowa, county seat of Des Moines co., is situated on the Mississippi River. It is a prosperous wholesale market, and manufactures furniture, mattresses, brooms, screens, tools, soap, flour, caskets, and engines and boilers; p. 30,613.

**Burlington**, city and port of entry, Burlington co., New Jersey, is situated on the Delaware River; is the seat of St. Mary's Hall for girls, the oldest church school for girls in America. Dairying and market gardening are extensively carried on; p. 12,051.

**Burlington**, city and port of entry, Vermont, county seat of Chittenden co., is situated on the eastern shore of Lake Cham-

plain. Burlington is the seat of the University of Vermont and State Agricultural College, whose buildings occupy a commanding site overlooking the town. Burlington has a good harbor and is connected by steamship line with other lake ports. The city was settled in 1763, was a garrisoned post during the war of 1812, and was chartered as a city in 1865; p. 33,155.

**Burlington House**, an old mansion situated in Piccadilly, London. The original building was erected about 1695 by Richard, Lord Burlington, and was purchased, with its gardens, by the government in 1854. In 1866 the Royal Academy of Arts leased quarters there, and in 1868-9 a block of exhibition galleries was added. In 1872 New Burlington House, the home of the Royal, Geological, Chemical, Astronomical, and Linnæan Societies, and the Society of Antiquaries, was completed.

**Burma, Union of**, a republic in eastern Asia bounded on the north by Tibet and China, on the east by China, Indo-China and Siam, on the south by the Bay of Bengal, and on the west by the Bay of Bengal



Burma: Pagoda, With Head of Buddha.

and eastern Pakistan. Area 261,789 sq. m. Of varied topography, the country falls into three natural divisions: Arakan, a strip of country bordering the Bay, from Cape Negrais to the Bengal Presidency, barren and



hilly in the north, but rich and fertile in the south and west; the Irawadi basin forming the main division and consisting of hills and plateaus in the north, lowlands in the centre, and fertile plains in the south; the old province of Tenasserim, a narrow strip of land along the Bay of Bengal, between it and Siam, mountainous and well watered. Burma is encircled on three sides by mountain ranges. The most important river is the Irawadi, nearly 1,000 m. long and navigable as far as Bhamo, 900 m. from the sea. The only other large stream is the Salwin, which flows into the Gulf of Martaban. The climate for at least half the year is humid and depressing, due to the abundant rainfall. That of Upper Burma is typically subtropical, that of Lower Burma tropical. Much of the province is clothed with dense forests containing fine dye and cabinet woods, teak wood being a particularly valuable product. Palm, coconut, and bamboo trees abound; bananas, pineapples, and many garden vegetables are grown. The rivers teem with fish, crocodiles, and turtles, and aquatic birds are numerous. The elephant, rhinoceros, tiger, bear, leopard, and many species of deer haunt the jungles. The extent of the mineral wealth of Burma is unknown. Petroleum is found along the banks of the Irawadi. Nearly three-fourths of the population of Burma are engaged in agriculture. Except for the rice mills, nearly all the manufactures of Burma are carried on in the homes. The population is about 19,045,000, consisting of Burmese, Karens, Arakanese, Kachins, Talaings, Taungthus, Shans, and Chins. The Burmese are Buddhists. At Mandalay there is a small community of Mohammedans. Except among the hill tribes, little success has attended the efforts of Christian missionaries. The Union Parliament consists of the Chamber of Deputies and a Chamber of Nationalities, elected for four-year terms. The President is elected by the Parliament for a five-year term, and only one re-election is allowed. The States of Shan, Kachin, Karen and Karenni, and the Special Division of the Chins, are represented in the Union government by their own ministers. The capital is Rangoon. The earliest European connection with Burma was in the 16th century, when the Portuguese concluded a treaty, 1519, with the King of Pegu, and the Dutch secured possession of the island of Negrais. In 1795 the British found themselves called upon to repel an invasion of Bengal by Burmese troops, and this led to the first Burmese War, which began in

1824 and lasted two years. Peace was unbroken until 1852, when political and commercial complications again drove the British into war, which, however, terminated in less than 12 months. As a result the whole of the territory now known as Lower Burma passed into the possession of the crown. Upper Burma maintained its independence until January, 1886, when, as a result of war with the Indian government, 1885, Thebaw was deposed. It was invaded by Japan, 1942-45. In 1947 Great Britain granted the country complete independence.

Burmese, an isolated language, is composed of mere roots incapable of composition or inflection, and altered by affix and prefix into different parts of speech. It prevails throughout Burma, except in coastal villages where Talaing is taught in Buddhist monasteries. The two great metaphysical works of Indian origin are the *Bee-da-gal thoon-bon*, or *Pitakatalayan* (The Three Baskets), and the *Baideng*. The drama, a national institution, is immensely popular. The dialogue is chiefly recitative, and solos, choruses, and dancing are interspersed, the music being sweet and attractive. Books, composed of leaves of the Palmyra palm joined at the ends by string, are bound between wooden covers, gilt, and lacquered in colored devices. The letters are engraved with an iron stylus. Consult Michener, J. A., *The Voice of Asia* (1951); Douglas, W. O., *North from Malaya; Adventure on Five Fronts* (1953).

**Burma Road**, the crookedest and most perilous main road in the world, built in 1936-37 as a supply line from Lashio, India to Chungking, China. Taken by the Japs, 1942, it was recaptured in 1945 and again opened.

**Burmeister, Richard** (1860), German-American pianist and composer, was born in Hamburg, Germany. From 1883 to 1885 he was occupied in giving concerts in various parts of Europe. He gave concerts generally in the United States until his appointment, 1903, as chief of the department of the piano at the Royal Conservatory of Music at Dresden.

**Burnaby, Frederick Gustavus** (1842-85), English cavalry officer and traveller. He travelled in equatorial and South America; acted as *Times* correspondent with the Carlist forces in 1874 and in the following year followed Gordon to the Sudan. In 1876 he went 'on horseback through Asia Minor' to study Turkish administration; commanded, in 1877, a Turkish brigade in the war with Russia, was wounded at El Teb, 1884, under

Graham; and in 1885 met his death from an Arab spear at Abu Klea, where he fought, under Sir Herbert Stewart, as a volunteer. See *Ride to Khiva* (1876); *A Ride across the Channel* (1882); also Ware and Mann's *Life* (1885).

**Burnand, Sir Francis Cowley** (1836-1917), English dramatic author and editor of *Punch* from 1880 until 1906. He was the author of nearly one hundred dramatic pieces, chiefly burlesques and comedies. He was knighted in 1903. In that same year appeared his *Records and Reminiscences*.

**Burne-Jones, Sir Edward, Bart.** (1833-98), British artist, of Welsh descent, was born in Birmingham. At first he studied, 1856, under Rossetti, and worked with him on the walls of the Oxford Union. Together with Rossetti and Morris he has profoundly affected the renaissance in England of decorative art proper and the artistic crafts. Down to about 1875 he worked principally in water colors, but after that date most of his pictures were done in oils. In 1885 he was elected A.R.A., but exhibited one picture only, and resigned in 1893. He was created baronet in 1894. Among his paintings are *Love Among the Ruins*, and *King Cophetua and the Beggar Maid* (1884). See 'Sir Edward Burne-Jones,' by Julia Cartwright, in *Art Annual* (1894); Malcolm Bell's *Burne-Jones: Life and Work* (new ed. 1901).

**Burnell, Arthur Coke** (1840-82), English Sanskrit scholar, born at St. Briavels, Gloucestershire. He was in the Indian civil service from 1857-68, and afterward became an authority on Sanskrit and S. Indian dialects, his principal work being *Classified Index to the Sanskrit MSS. in the Palace at Tanjore* (1880).

**Burnes, Sir Alexander** (1805-41), traveller in Asia, a native of Montrose, Scotland, entered the Indian army in 1821. In 1832-3 he explored, in disguise, Afghanistan, Bokhara, and Persia, and published *Travels into Bokhara*, 1834, which proved very popular.

**Burnet.** Perennial herbs of the rose family. They have pinnate, serrate leaves.

**Burnet, Gilbert** (1643-1715), bishop of Salisbury, was the youngest son of Robert Burnet of Crimond, Aberdeenshire, and was born in Edinburgh. He was elected to the chair of divinity in the University of Glasgow in 1669. Throughout his life Burnet exercised a great influence on British politics, and his fearless criticism of Charles II. and his championship of Lord William Russell

aroused the displeasure of the king. The revolution of 1688 had no stronger supporter than Bishop Burnet, who at length accepted the episcopal dignity under William of Orange, being consecrated bishop of Salisbury in 1689. His most famous achievement, *Bishop Burnet's History of his Own Time*, a history of great and lasting value, was not published until 1724-34, and even then not without mutilations; the first complete version was issued by Dr. Routh at Oxford, in 6 vols., in 1823 (newer ed. 1897).

**Burnett, Frances Hodgson** (1849-1924), English novelist, spent her early life in Manchester, and there gained her knowledge of Lancashire scenes and dialect. In 1865 her parents removed to the United States, and she began to write stories for the American magazines. She lived in Tennessee previous to her marriage to Dr. S. M. Burnett, an oculist of Washington, D. C. She was made famous by 'That Lass o' Lowrie's,' published in *Scribner's*, and then separately (1877). *Little Lord Fauntleroy* appeared in 1886, and both as novel and as drama achieved exceptional success.

**Burney, Frances, Mme. D'Arblay** (1752-1840), English novelist, was born at King's Lynn. *Evelina, or the History of a Young Lady's Entrance into the World*, was published anonymously in 1778. It achieved an immediate success. *Cecilia, or the Memoirs of an Heiress*, followed in 1782, with even greater éclat. In 1786 she became second keeper of the robes to the queen; but her health broke down under the restraint of court life, and she retired on a pension in 1791. Two years later she married General D'Arblay, a French refugee. Her *Diary* (published with her letters, 5 vols., in 1842 and 2 further vols. in 1846) form an almost continuous narrative from 1778 to 1800, and, in its brilliant sketches of court life and society, exhibits at their best her signal powers of satire and observation. Consult *Diary of Fanny Burney*, selections by Lewis Gibbs (pseud.) (1940).

**Burnham Beeches**, a picturesque part of an ancient forest in Buckinghamshire, England. See Sheahan's *Hist. of Buckinghamshire*.

**Burnham, Sherburne Wesley** (1838-1921), American astronomer, born at Thetford, Vt. In 1869 he obtained a Clark 6-in. telescope, and, favored with exceptionally clear vision, initiated his discoveries of double stars. In 1894 he was awarded the gold medal of the Royal Astronomical Soci-

ety of London for his discoveries up to that year, numbering 1,274. Mr. Burnham was one of the astronomers of Lick Observatory from 1888 to 1892, resigning in the latter year. In 1897 he was associated with the Yerkes Observatory, and subsequently became professor of practical astronomy at the University of Chicago.

**Burning Bush**, several deciduous and evergreen ornamental shrubs of the genus *Eunonymus* and order Celastrineæ, with scarlet fruits.

**Burnley**, mkt. tn., munic., parl., and co. bor., E. Lancashire, England. The public buildings include Victoria Hospital, mechanics' institution and school of science, and technical school; p. of munic. bor., 106,337; of parl bor., 84,950.

**Burnouf**. (1.) JEAN LOUIS (1775-1844), French philologist, born at Urville, became assistant professor of rhetoric at the Lycée Charlemagne in Paris, and was soon afterwards presented to the chair of rhetoric at the Lycée Imperial, which he held till 1826. The *Méthode pour Etudier la Langue Grecque* (1814) and *Méthode pour Etudier la Langue Latine* (1840) are his most important works. (2.) His son EUGÈNE (1801-52), born at Paris, devoted himself to the study of Oriental languages. He is remembered for his deciphering of the Zend mss. brought to Paris by Anquetil Duperron, his lithographed edition of the *Vendidad-Sadé* (1829-43), and his *commentaire sur le Yacna* (1833-4), which first made Zoroastrianism known to the West. (3.) EMILE LOUIS (1821), *Orientalist*, cousin of the preceding, published *Méthode pour Etudier la Langue Sanscrite* (1859), *Dictionnaire Classique Sanscrit-Français* (1863-4).

**Burns, Anthony** (c. 1830-62), fugitive slave, was born in Va., and escaped from slavery in that state and made his way to Boston, Mass., in the winter of 1853-4. He was discovered and arrested by a U. S. marshal. Public feeling in Boston was violently stirred up, and a meeting was called at Faneuil Hall. Simultaneously an unsuccessful attempt was made to rescue Burns. On the following day, an examination was held by U. S. Commissioner Loring, who decided, on the evidence, that Burns must be returned to his master. The incident did more to crystallize public opinion in the North than any one occurrence save the hanging of John Brown. Burns afterward became a Baptist minister, and settled in Canada.

**Burns, Robert** (1759-96), Scottish poet, was the son of a gardener, and was born at

Alloway, near Ayr, Scotland. On the father's death (in difficulties), in 1783, Robert and Gilbert took the farm of Mossgiel, in the parish of Mauchline, two or three miles from Lochlea. But for them, as for William Burns, farming was a losing game. Industry was of no avail against adverse circumstances, and Robert submitted more and more readily to his destiny as a poet. The song *Mary Morison* was a product of the Tarbolton period. *The Epistle to Davie* was the prelude to an output of poetry from Mossgiel, which in a year or two furnished



Robert Burns.

(From a drawing by Skining.)

forth the contents of that treasure of the bibliophile, the Kilmarnock Burns. An inherited liberalism in theology impelled him to use his talent in the battle, which was then at its height, between 'Old Lights' and 'New Lights' (afterwards Moderates and Evangelicals) in the Church of Scotland. The result was a series of satires which made for the poet a wide reputation for latitudinarianism. To this period belong *The Twa Herds*, and the *Address to the Deil*. To the winter of 1785-6 are assigned the last of these, and also *To a Mouse*, *Hallow E'en*, *Man was made to Mourn*, *The Cottar's Saturday Night*, and *Scotch Drink*.

The poet had reached his full stature. Then a moral slip drove him to publication and

fame. In the spring of 1786 it became necessary for him to acknowledge as his wife Jean Armour, Mauchline girl, and in order to support her he thought of going to Jamaica to seek his fortune. But the publication of the *Kilmarnock* volume changed the current of his life. The gentry of Ayrshire were proud to cultivate the author; and the Jamaica venture was abandoned when Jean Armour made him a father.

The first Edinburgh edition of his poems was published in 1787 by subscription, and ultimately he gained some £500 by it. In February, 1788, he went home to Mossgiel, and finding Jean Armour on the point of again making him a father, married her. He had taken a lease of the farm of Ellisland, in Dunscore parish, Dumfriesshire, but the double labor of farming and 'gauging,' proved too severe, and by the end of 1791 he was glad to break the lease and remove to Dumfries, where he spent the rest of his life in the service of the excise. At Ellisland he wrote a great many songs, including *Mary in Heaven*, *Auld Lang Syne*, and *Ye Banks and Braes*, for Johnson's *Scots Musical Museum*, to which he had begun to contribute during his stay in Edinburgh; also *Tam o'Shanter*, *The Whistle*, and *The Kirk's Alarm*. He died after rheumatic fever in 1796. He wrote songs to the last—for instance, *Duncan Gray and O wert thou in the Cauld Blast*.

Burns was the greatest of the Scotch vernacular poets, from whom—as Hamilton and Semple, through Ramsay and Fergusson—he took his forms and metres. In the vernacular he was at his best, a supreme artist in words and an unequalled song-writer. Consult his *Complete Poetical Works* (1904) and *Letters*, ed. by J. D. Ferguson. 2 vols. (1931); Lockhart, J. G., *Life of Robert Burns* (1907); Ferguson, J. D., *Pride and Passion* (1939).

**Burns and Scalds** are considered together, as, for practical purposes, their effects are the same, and differences in treatment depend only upon the extent of injury and the amount of sepsis (bacterial infection) present or to be feared.

The danger of a burn is proportionate to its superficial extent, and depends also partly upon its position. Death may be expected if half the surface of the body is affected, even though there be no depth of tissue destroyed. Burns on the trunk are more dangerous than those on the limbs, and children succumb more readily than adults. The local treatment of burns depends to some extent upon their position, depth, and extent. The aim is

to counteract sepsis, or to prevent it; to relieve pain; and to prevent scarring, or, if that be impossible on account of the depth of burn, to make it as slight as possible, and to guard to the utmost against deformity by contraction.

**Burnside, Ambrose Everett** (1824-81), American soldier, born at Liberty, Ind. In the Civil War he was one of the most prominent generals on the Federal side. He commanded a brigade in the first battle of Bull Run, and assumed command of the newly organized Ninth Corps, which became part of the Army of the Potomac, then under Gen. McClellan. Burnside commanded the Federal left in the battle of Antietam, Sept. 16-17 and on Nov. 7 was placed in command of the Army of the Potomac—a position which he had twice declined and for which he felt himself unfit. After thoroughly reorganizing the army, he impetuously attacked Lee, then occupying a position of great strength at Fredericksburg, Va. (Dec. 13, 1862), and was disastrously defeated. (See *FREDERICKSBURG BATTLE OF*). While preparing for a second attack he was superseded by Hooker, Jan. 26, 1863. He was later besieged for some time in Knoxville, Tenn., by Longstreet, and once more at the head of the Ninth Corps of the Army of the Potomac, he took part in the Virginia campaign of 1864. After the war, Burnside was governor of Rhode Island, 1866-9, and U. S. Senator, 1875-81. While in Europe during the Franco-Prussian War, 1870, he acted as a medium of communication between the hostile armies. Consult *Life* by Poore.

**Burnt Stones**, antique gems of carnelian, sometimes engraved, found in Roman ruins.

**Burr, Aaron** (1716-57), American clergyman and educator, father of Aaron Burr, was born in Fairfield, Conn. From 1748 until his death he was president of the College of New Jersey, Princeton College, and was its principal organizer and developer.

**Burr, Aaron** (1756-1836), American political leader and Vice-President of the United States, was born in Newark, N. J., son of Aaron Burr, and of Esther, the daughter of Jonathan Edwards. He served with marked ability in the American Revolution; took part in Benedict Arnold's Canadian expedition, 1775; rose to the rank of lieutenant-colonel, 1777; and was a member first of Washington's and then of Putnam's staff, 1776. In 1782 Burr was admitted to the bar at Albany, N. Y.; in the national campaign of 1800 he was the candidate of the Democratic-Repub-

lican Party for the Presidency; and he and Thomas Jefferson having received the same number of electoral votes, the choice devolved upon the House of Representatives. Jefferson, largely through the aid of Federalists, influenced by Alexander Hamilton, was chosen President; and Burr became Vice-President, 1801-5. Burr, deeply angered, later forced a duel upon Hamilton, whom he fatally wounded at Weehawken, N. J., on July 11, 1804.

This rendered Burr practically an outcast in New York, where, as also in New Jersey, he was indicted for murder. On this account, and also to recuperate his fortunes, he turned to the rapidly developing West and Southwest, and devoted himself for the next two years to what has become known as the *Aaron Burr Conspiracy*. He was arrested on a charge of treason and after a notable trial at Richmond, in 1807, he was acquitted. Burr then went abroad, 1808, largely to secure aid in the further prosecution of his designs, and after enduring many privations and insults, returned to America, 1812, and thereafter lived in New York City. He died at Port Richmond, N. Y., and was buried at Princeton. In 1782 he married Theodosia Prevost, widow of a British officer, who bore him one child, Theodosia Burr; and in 1833 he m. Mme. Jumel. Consult Wandell, S. H., and Minnigerode, Meade, *Aaron Burr, a Biography*. 2 vols. (1925); Alexander, H. M., *Aaron Burr, the Proud Pretender* (1937).

**Burr Conspiracy.** See Burr, Aaron.

**Burrell, David James** (1844-1926), American clergyman, was born in Mount Pleasant, Pa. In 1891 he accepted the pastorate of the Marble Collegiate Church in New York City. He published a number of religious volumes.

**Burritt, Elihu** (1811-79), American peace advocate and author, known as 'the learned blacksmith,' was born in New Britain, Conn. Visiting England, 1846-9, he was one of the organizers of an international association, the 'League of Universal Brotherhood.' He was also instrumental in organizing the First International Peace Congress at Brussels, in 1848, and the Second at Paris, under the presidency of Victor Hugo, in 1849. Among his publications are: *Sparks from the Anvil* (1848); *Olive Leaves* (1850); *Chips from Many Blocks* (1878). See his *The Learned Blacksmith*, ed. by Merle Curti (1937).

**Burro**, a small donkey used as a pack animal in the mountainous districts of the southwestern United States and Mexico.

**Burroughs, George** (c. 1650-92), Amer-

ican clergyman. In 1692, he was charged in Salem, with tormenting Mary Wolcott and others by wicked arts and was executed on Aug. 19. See WITCHCRAFT.

**Burroughs, John** (1837-1921), American naturalist and writer, was born in Roxbury, N. Y., where his father was a farmer. In 1872 he left Washington, where he had been for nine years connected with the Treasury Department, and two years later established himself on a farm at West Park on the Hudson.

Burroughs' first article was published in *The Atlantic Monthly* for 1860. His first published volume, *Notes on Walt Whitman as Poet and Person* (1867), grew out of his personal acquaintance with 'the good gray poet' at Washington, of whom he was always a supporter. It was followed by *Wake Robin* (1871); *Time and Change* (1912); *The Breath of Life* (1915); *Accepting the Universe* (1920). Consult Barrus, Clara, *The Life and Letters of John Burroughs*. 2 vols. (1925); *The Heart of Burroughs' Journals* (1928); *John Burroughs' America* (1951).

**Burrus, Afranius**, a Roman soldier of distinction under Claudius and Nero. In 52 A.D. he was appointed sole commander of the prætorian guards and it was mainly owing to his influence that Nero was declared emperor. Weary of his control, Nero caused him to be poisoned in 63 A.D.

**Bursa**, a synovial sac interposed between muscles, tendons, or skin and bony prominences, whose function it is to lessen the friction to which these parts are exposed. Some bursæ are constantly present, but others are developed as the result of occasional friction of muscles against each other or adjoining parts. Inflammation of a bursa is known as bursitis, and occurs in several forms, of which 'housemaid's knee' and 'miner's elbow' are familiar.

**Bursar**, a name given to the treasurer or subtreasurer in English and many American universities. In Scotland the term is used also for the recipient of a bursary or annual allowance similar to English and American scholarships.

**Burschenschaft**, a student organization in German universities whose aim is threefold: moral character and breeding, good fellowship, and patriotism. The first association was formed at Jena (1815). The governments of Central Europe later suppressed the organizations, but they soon revived, only to be proceeded against once more in 1830-3. All special restrictions against the *Burschenschaft*

societies were withdrawn in 1848, and they still flourish and are generally considered to exert a good influence.

**Burslem**, parliamentary and municipal borough and market town, England, in Staffordshire; p. 41,566.

**Burton, Harold Hitz** (1888- ), U.S. Supreme Court Justice, was born in Jamaica Plain, Mass.; was graduated from Bowdoin College, 1909; from Harvard Law School, 1912; in World War I was a 1st Lieutenant; honored with the order of the Purple Heart and the Croix de Guerre from Belgium. In the Ohio House of Representatives, 1929; Mayor of Cleveland, 1935-39; U.S. Senator, 1940-45. In Sept., 1945, was named to the Supreme Court of the U. S. by President Truman.

**Burton, Marion Le Roy** (1874-1925), American educator, was born in Brooklyn, Iowa. He was president of Smith College, Northampton, Mass., from 1910 to 1917 when he became president of the University of Minnesota. From 1920 until his death he was president of the University of Michigan. He was the author of *The Problem of Evil* (1909); *On Being Divine* (1916); etc.

**Burton, Richard** (1861-1940), American man of letters, was born in Hartford, Conn. In 1906 he became head of the English department at the University of Minnesota, a position which he resigned in 1925 to devote himself to writing and lecturing. His literary works include: *Charles Dickens—How to Know Him* (1919); *American Drama* (1926).

**Burton, Sir Richard Francis** (1821-90), British traveller, linguist, and author, was born in Hertfordshire. Entering the East India service in 1842, he explored the Nilgiri Hills, served for five years in Sindh with Sir C. Napier, and in 1851 published his first important work, *Sind, or the Unhappy Valley*. The account of his later adventures, entitled *Narrative of a Pilgrimage to El Medinah and Meccah*, appeared in 1855-6. He next turned his attention to Africa, penetrated to the lake regions of Central Africa, and discovered Lake Tanganyika (1858). His later publications included *Wanderings in West Africa* (1863); and a new and literal translation of the *Arabian Nights*, under the title of *The Thousand Nights and a Night* (16 vols. 1885-8). Burton was knighted in 1886. Consult Dodge's *The Real Sir Richard Burton*.

**Burton, Robert** (1557-1640), English scholar, was born in Lindley, Leicestershire. In 1606 he wrote a Latin comedy called *Philosophaster*, which was acted in Christ Church

hall in 1618, and in 1621 published that singular medley of erudition and nonsense, the *Anatomy of Melancholy*.

**Burton, William Evans** (1804-60), Anglo-American actor and dramatist, was born in London, England. He made his debut as an actor at the Pavilion, in London, in 1831, and in 1834 went to the United States. He wrote several plays, of which *Ellen Wareham* was the most successful.

**Burton-on-Trent**, municipal and co. borough, England, in Staffordshire, on the Trent. The town's main interest lies in its huge breweries, which have been in existence for centuries; p. 49,169.

**Buru, Buro, or Bulu**, island, Repub. of Indonesia, in the Molucca group, situated between Ceram and Celebes, and almost entirely surrounded by coral reefs; area, 3,425 sq. m. The capital is Kajeli; p. about 20,000, mostly Alfuras.

**Burujird**, town, Iran, in the province of Irak-Ajimi; 70 m. s.e. of Hamadan; p. about 25,000.

**Bury**, municipal and co. borough and market town, England, in Lancashire, on the Irwell; features of interest are the Art Museum, containing the valuable Wrigley art collection, and monuments to Robert Peel and John Hay, the inventor of the fly shuttle; p. 58,829.

**Burying Beetles**, insects of the family Silphidae, so-called from their habit of making excavations under the dead bodies of small vertebrates, in order to bury them.

**Bury St. Edmunds**, town, England, in West Suffolk, on the Lark. It owes its importance to the shrine of the martyred Edmund, last king of East Anglia, which was long a noted place of pilgrimage. Bury St. Edmunds, or Saint Edmundsbury, as it was called in early times, was a place of importance in the Saxon period. It is said to have been the Roman Villa Faustina. It contains many interesting antiquities; p. 15,941.

**Busch, Julian Hermann Moritz** (1821-99), German publicist, called 'Bismarck's Boswell,' was a native of Dresden. Called to Berlin in 1870, he became one of Bismarck's press agents, and held this position throughout the Franco-German War. His memory rests upon his works on Bismarck.

**Busch, Wilhelm** (1832-1908), German cartoonist, was born in Hanover. He first attracted attention about 1859 by his illustrations in the well known weekly, *Fliegende Blätter*, later collected as *Bilderbogn*, 1875. He also wrote and illustrated a number of

tales in doggerel, of which the most famous is *Max and Moritz*, 1865.

**Buschmann, Johann Karl Eduard** (1805-80), German philologist, was born in Magdeburg. After a voyage to Mexico, 1827-8, he assisted the Humboldts in the preparation of their works, and became librarian of the Royal Library at Berlin, 1853, and a member of the Academy of Science, 1851. He is remembered for his philological researches in Malay-Polynesian and South American languages.

**Bush, Irving T.** (1869-1948), American business man, was born in Ridgeway, Mich. He early interested himself in the relief of business and traffic congestion in New York City, and in 1895 established a number of warehouses which led subsequently to the founding in Brooklyn, N. Y., of the Bush Terminal.

**Bush Antelope, Boschbok, or Bush Buck**, a small harnessed antelope of South Africa, of which there are several varieties, hunted in bushy districts. They are brilliantly colored, with harness-like markings.

**Bush-Brown, Henry Kirke** (1857-1935), American sculptor, was born in Ogdensburg, N. Y. His works include equestrian statues of *General Meade*, *General Reynolds*, and *General Sedgwick*, and the *Lincoln Memorial*, all at Gettysburg and the *H. B. F. Macfarland Memorial*, Washington, D. C.

**Bushel.** See **Weights and Measures.**

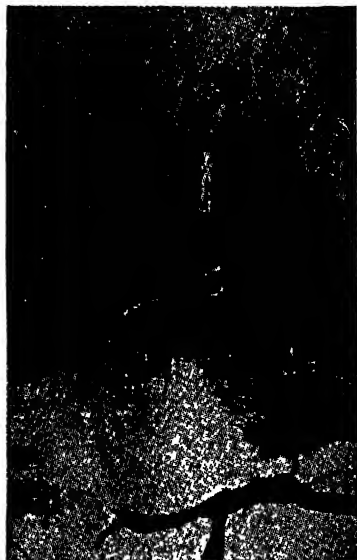
**Bushido**, the creed of the *bushi* or *samurai*, the warrior and gentry class of feudal Japan. It required that the samurai be sober, frugal, and industrious, that he cultivate learning, loyalty, and filial devotion, and that he be willing not only himself to meet death, even by his own hand, for his country's sake, but, if necessary, to sacrifice the lives and honor of those nearest and dearest to him.

**Bushire, Bushahr, Abushehr, or Bandar Bushire**, seaport city, Iran, situated on the eastern shore of the Persian Gulf. It has extensive bazaars and an important caravan trade, but the streets are narrow and dirty. The chief exports are opium, raw cotton, carpets, tobacco, mother-of-pearl, and hides and skins. Bushire is the seat of several European consuls; p. (est.) 27,317.

**Bushmaster**, a large and extremely poisonous snake of Northeastern South America, closely related to the rattlesnakes, but with a spike at the end of the tail in place of a rattle.

**Bushmen**, native tribes formerly spreading from the Cape as far north as the Zam-

bezi River, but at present chiefly confined to the Kalahari Desert and the northern parts of Southwest Africa. The Bushmen are still savages, with no tribal organization and scarcely any household goods or permanent homes. Consult Stow's *Native Races of South Africa*; Bleek's *Bushmen Folklore*; Dornan's *Pygmies and Bushmen of the Kalahari*.



*Bushman.*

**Bushnell, Horace** (1802-76), American theologian, was born in Litchfield, Conn. His book, *God in Christ* (1849), denying the adequacy of language to express spiritual truth, brought against him a charge of heresy, which, however, was not sustained, and to which he replied in *Christ in Theology* (1851). Consult biographies by Cheney and by Munger.

**Bushrangers**, a term applied in Australia to the brigands or outlaws who infested outlying settlements during the first three-quarters of the 19th century. The earlier bushrangers were mostly escaped convicts. Later, these brigands banded together and became so serious a menace as to necessitate the Bushranging Act of 1830 (renewed in 1834), a drastic measure which put a stop to bushranging on a large scale. Consult Boxall's *Australian Bushrangers*; Dunbabin's *The Making of Australasia*.

**Bushwhacker**, originally one accustomed to beat about or live in the woods, applied

specifically in the United States, during the Civil War, to irregular troops in the Confederate States engaged in guerrilla warfare. They seldom fought in the open but confined their actions to cutting off small parties and to raiding.

**Business Education.** See **Commercial Education.**

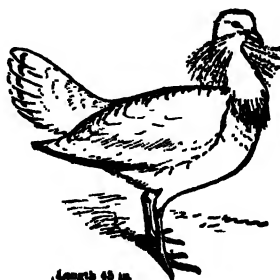
**Busiris**, a mythical king of Egypt, reputed founder of the city of Zeus, or Thebes, was killed by Hercules. The name was also used of a city of ancient Egypt, now identified with the modern Abusir, in Lower Egypt, not far from Alexandria.

**Buskin**, a kind of high boot laced to the ankle and lower part of the leg. In early times it was worn particularly by the actors of tragedy.

**Busoni, Ferruccio Benvenuto** (1866-1924), Italian pianist and composer, was born in Empoli, near Florence. In 1890 he taught music at the Moscow Imperial Conservatory, and the following year began his professorship at the New England Conservatory of Music in Boston. He was a member of the Royal Academy of Music, Bologna, and was especially known as an interpreter of the works of Bach. His compositions include chamber music, orchestral scores, and works for the piano.

**Bussey, Benjamin** (1757-1842), American merchant and benefactor, was born in Canton, Mass. He served in the Revolutionary army, entered the foreign trade, in which he amassed a fortune; bequeathed all of this to Harvard, after the death of certain relatives, one-half for the endowment of a school of agriculture and one-half for the support of the law and theological schools.

**Bust.** See **Sculpture.**



*Great Bustard.*

**Bustard**, a name applied to birds of the family *Otididae* in general, but especially to *Otis tarda*, the Great Bustard, which is one of

the largest of land birds, the wing span being eight feet or more. It still exists in the central and southern parts of Europe, in North Africa, and in Asia.

**Busto Arsizio**, town, Italy, in the province of Milan. In the church is a fine altarpiece by Gaudenzio Ferrari; p. 50,325.

**Bus Transportation**, the public conveyance of passengers in the modern automotive highway motor coach or motor omnibus. It is difficult to determine when the first motor bus was used. In 1829 a steam omnibus was patented in England by Walter Hancock, and he was one of the first persons to run a steam carriage for hire. In 1833 there were 20 steam carriages built, or in process of construction, in London alone. In France, Amédée Bollée built a twelve-passenger steam car in 1873, and an improved omnibus, *La Nouvelle*, in 1880. This last vehicle in 1895, in the famous race from Paris to Bordeaux and return, made the 745 m. in 90 hours and 3 minutes. The real development of the motor bus did not come about, however, until the introduction and perfection of the gasoline motor. The first motor bus to be operated on a regular schedule in America was put in service on Fifth Avenue, New York City, in 1907. Except for the Fifth Avenue buses, and their counterparts in London, Paris, and other cities, there were comparatively few important bus operations prior to 1920.

The years following 1910 saw the introduction in many American cities, of the so-called 'jitney bus,' taking its name from the five-cent fare usually charged. This was usually a five- or seven-passenger touring car, frequently bought second-hand by the operator. The essential feature of the bus of the present is that it is in most respects a distinctive vehicle as compared either with the pleasure automobile or the motor truck. There are now three recognized types of buses, designated respectively as the school, street-car, and parlor-car types. The school buses are mostly adaptations of earlier designs. The street-car type, as the name indicates, is designed for urban service and the parlor-car type for interurban or long distance service. Double-deck buses are in use or formerly used in New York, Chicago, Philadelphia and other cities, and there are instances of long-distance double-deck bus operation. For illustration see **MOTOR CARS**.

An interesting feature in connection with bus operation is the operation of such vehicles by the street railways. The steam railroads have not thus far engaged extensively



in bus operation. Bus operation by steam railways began in 1923 with small operations of two railroads. The New York, New Haven & Hartford began operations on a small scale in September, 1925. Legal means by which buses could be operated on highways, for hire, and between fixed termini were first determined in Massachusetts in 1916, in Connecticut 1921; Rhode Island, 1922. Street railways were permitted to operate buses in Massachusetts in 1920, in Connecticut in 1921, and in Rhode Island in 1922. Steam railways in these States were not given authority to operate buses until 1925. Most of the States have established some method of public regulation. The more common practice places this with the State public utilities commission, from which the prospective bus operator is required to procure a certificate of public convenience and necessity. The commission is empowered to alter or cancel such certificates, and has supervision over fares, schedules, and service. In most States having such regulation, the filing of an indemnity bond is required. See MOTOR CARS.

**Butane**, either of two isometric paraffins having the formulæ  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$  and  $\text{CH}_3\text{CH}(\text{CH}_3)_2$ . They are both inflammable gases.

**Butcher, Samuel Henry** (1850-1910), professor of Greek at Edinburgh University (1882-1903), was born in Dublin. He published *Prose Translation of the Odyssey*, with Andrew Lang (1889); *Aristotle's Theory of Poetry and the Fine Arts, with a Critical Text and Translation of the Poetics* (1895, 1897); *Harvard Lectures*.

**Butcher Bird**, a shrike so-called from the habit of impaling prey on thorns.

**Butcher's Broom**, the popular name for a few species of European diœcious shrubs of the order Liliaceæ.

**Bute, John Stuart**, Third Earl of (1713-92), British statesman, said to have been the most unpopular minister who ever held office in England. He succeeded Pitt to the office of prime minister, 1762, till he was forced by popular feeling to retire, 1763. The responsibility for a new policy towards the American colonies, was not his, however, but his royal master's. Bute gave Johnson an annuity of £300.

**Butea**, a genus of Indian and Chinese shrubs or small trees of the order Leguminosæ.

**Butler**, city, Pennsylvania, county seat of Butler co. The town is the centre of a rich oil, gas, coal and iron region; p. 23,482.

**Butler, Alban** (1711-73), Roman Catholic biographer. His monumental work, *The Lives of the Saints*, the result of thirty years labor, was published in 1756-9. Appearing posthumously were *Moveable Feasts and Fasts, Meditations and Discourses*, and *The Life of Sir Tobie Matthews*.

**Butler, Amos William** (1860-1937), American ornithologist and sociologist. He was a founder of the Indiana Academy of Science, became its president in 1895, and was ornithologist to the Indiana State department of geology and natural resources in 1896-7. He published *The Birds of Indiana, A Century of Progress of Charities and Correction in Indiana*, and papers on sociology and natural science.

**Butler, Benjamin Franklin** (1795-1858), American lawyer, was born in Kinderhook Landing, N. Y. He was U. S. attorney-general under President Jackson. In 1836-7 he was also acting secretary of war. He prepared the plan for organizing the law department of the University of New York, and was its principal professor from 1837.

**Butler, Benjamin Franklin** (1818-93), American political leader and soldier. Early in 1862 he commanded the land forces which accompanied Farragut in his expedition against New Orleans. After Butler's summary execution, June 7, of W. B. Mumford, who had hauled down the U. S. flag, President Davis issued a proclamation, Dec. 23, 1862, directing that Butler, if captured, should be hanged without trial. After the war he was a Republican representative in Congress, being a leader in the impeachment trial of President Johnson; in 1882-3 was governor of Massachusetts.

**Butler, Charles** (1802-97), American lawyer, was born in Kinderhook Landing, N. Y. He was a founder, 1835, and a liberal benefactor of the Union Theological Seminary, and interested himself in other educational and charitable institutions.

**Butler, Charles Henry** (1859-1940), American lawyer, was born in New York City; in 1898 was legal expert for the Anglo-American commission for the delimitation of the Alaskan boundary. In 1902 he was appointed reporter of decisions to the U. S. Supreme Court. He was the author of *Cuba Must Be Free* and other works.

**Butler, Elizabeth Southerden, Lady**, (1843-1933), English military painter, daughter of Thomas J. Thompson, was married, 1877, to Major-General Sir William

**Francis Butler.** Among her works *Roll Call* was purchased by Queen Victoria.

**Butler, Ellis Parker** (1869-1937), American humorous author, was born in Muscatine, Iowa. His writings include *Pigs is Pigs* (1906).

**Butler, Nicholas Murray** (1862-1947), American publicist and educator, was born in Elizabeth, N. J. From 1901 to 1945 he acted as both professor of philosophy and education and president of Columbia University. He was chairman of the New York Republican Convention in 1912; received the Republican electoral vote for Vice-President in 1913; was a leader in repeal of the Prohibition amendment, and has been honored by numerous foreign governments; he was awarded one-half of the Nobel Peace Prize in 1931. Dr. Butler founded and edited *The Educational Review*. His published works include *The International Mind* (1912); *Looking Forward* (1932); *Across the Busy Years*. 2 vols. (1939-40).

**Butler, Pierce** (1866-1939), American public official, was counsel for the U. S. government in the prosecution of the Chicago meat packers for violation of the Sherman Act and in 1922 was appointed an associate justice of the U. S. Supreme Court.

**Butler, Samuel** (1612-80), English poet. After the Restoration, he was appointed steward of Ludlow Castle, 1660. The legend that Butler was secretary to Buckingham when chancellor of Cambridge is scouted by Dr. Johnson. Butler published the first part of his famous *Hudibras* in 1663, the second in 1664, and the third in 1678, and in the end he had not finished his ridicule of fanatical Puritanism. It is a storehouse of pungent criticisms, terse epigrams, and wise saws, which have passed into the language of daily life. Other works have merit, but fall far below *Hudibras*. In 1721 a monument was erected to him in Westminster Abbey. Consult Johnson's *Lives of the Poets* and Henry Morley's *Character Writings of the Seventeenth Century*.

**Butler, Samuel** (1835-1902), British author. In 1872 he published *Erewhon*, a paradoxical Utopia abounding in humor and irony, in which he satirized the Darwinian theory; and in 1901 a sequel, *Erewhon Revisited*. He also wrote *The Way of All Flesh* (1903), *Essays on Art, Life, and Science*, and numerous other works. He translated the *Iliad* and the *Odyssey*.

**Butler, Smedley Darlington** (1881-

1940), United States Marine Corps officer, was born in West Chester, Pennsylvania. From 1899, when he was first appointed to the Marine Corps, he rose through the ranks until 1921, when he became Brigadier General, and in 1931 Major General retired. In 1924-25 he was on leave of absence and served as Director of the Department of Public Safety, Philadelphia. He was awarded the U. S. Distinguished Service Medal and the Congressional Medal of Honor.

**Butler College**, a coeducational, non-sectarian institution, chartered 1850 and under the control of the Disciples of Christ; situated in Indianapolis, Ind.

**Buto**, an Egyptian goddess, her oracle being one of the most celebrated in Egypt. Her older name was Uto, and she was represented as a serpent, sometimes with wings.

**Buton**, island of the Republic of Indonesia; p. 100,000.

**Butt, Isaac** (1813-79), Irish political leader, was chosen leader of the Home Rule party. He wrote *Home Government for Ireland* (1874); *The Problem of Irish Education* (1875).

**Butte**, (Western United States), a knoll or isolated hill, the result of erosion, usually located in an arid or semi-arid plain.

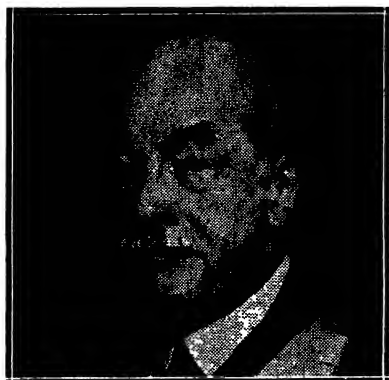
**Butte**, largest city in Montana, county seat of Silver Bow co., is situated in a picturesque region of the Rocky Mountains on the slopes of the continental divide at an altitude of 5,700 ft. Public institutions and buildings include the State School of Mines. Extensive copper, gold, silver and zinc mines make Butte one of the greatest mining centres of the world; p. 33,251.

**Butter** is the product obtained by churning milk or cream, and working the mass to remove the constituents other than fat. Butter fat is made up of ten component fats, and is easily decomposed in spite of all known methods of preservation. It is almost completely digestible, and is especially adapted for human food.

The modern method of creaming now generally used in large dairies and creameries is the centrifugal method, in which the fat is removed by means of the cream separator.

The cream may be churned at once, making sweet-cream butter, which is mild in flavor and does not keep long; or it may first be 'ripened.' The ripening process is one of carefully controlled fermentation and is usually accomplished by the addition of a 'starter' containing the desired organisms but no injurious forms. Churning consists in sub-

jecting the cream to violent agitation, so that the fat globules are collected in a granular mass. The butter is then washed, salted, worked either by hand or with a butter worker, and made into prints or packed in tubs or boxes for the market. The creamery system has spread rapidly in all parts of the country, and a larger amount of butter is now made in factories than on farms.



Nicholas Murray Butler.

Oleomargarine is a mixture of various animal and vegetable fats, churned with milk to impart a butter flavor. Butterine is oleomargarine mixed with more or less butter. Butter is one of the most important sources of fat in man's diet as it contains a considerable amount of Vitamin A. (See VITAMINS). Consult Totman, C. C., and others, *Butter* (4th ed. 1939); Eckles, C. H., and others, *Milk and Milk Products* (for agriculture college students) (4th ed. 1951).

**Butter, Rock, or Mountain**, a combination of alum and iron, having the appearance of butter, which exudes from aluminiferous rocks.

**Butter-and-Eggs**, a common name for the Yellow Toadflax.

**Butterbur**, or **Bog Rhubarb**, popular name of *Petasites vulgaris*, a genus of Compositæ.

**Buttercup**, a name applied to various species of Ranunculus.

**Butterfield**, **Kenyon Leech** (1868-1935), was educated at Michigan Agricultural College, and editor of various agricultural publications.

**Butterfish**, a local name for the harvest fish and some others which are noted for fatness.

**Butterflies**, a group of insects which, to-

gether with the moths, constitute the insect order Lepidoptera. The wings, which vary greatly in shape and size, are covered with beautiful scales, diversified in form and color. They are found almost everywhere, but most of them thrive best in the sunshine and warmth of the tropics and in temperate regions. Their life history is divided into the period of incubation in the egg, the larval or caterpillar stage, the transformation into the pupa or chrysalis, and the final emergence as the imago, or perfectly developed insect. The butterflies may be divided into five principal families, as follows: the Nymphalidæ, Lemoniidæ, Lycenidæ, Papilionidæ, and Hesperiidæ. Familiar species of Nymphalidæ are the Fritillaries, and Admirals. The Lemoniidæ, or 'metal-marks,' are rather small and brilliantly colored and mostly tropical. The Lycenidæ include some of the gayest and most attractive members of the butterfly world. The Papilionidæ or 'swallow-tails' include the largest species of butterflies. The Hesperiidæ or 'skippers' are found chiefly in South America and in many of their habits resemble the moths. Consult Matschat, C. H., *American Butterflies and Moths* (1942); Klots, A. B., *Field Guide to the Butterflies of North America* (1951).

**Butterfly Fish**, a carnivorous fish of the tropical seas, belonging to the family *Chaetodontidæ*.

**Butterfly Weed**, **Orange Milkweed**, or **Pleurisy Root**, a North American plant of the milkweed family.

**Buttermilk**, a by-product resulting from the churning of cream to make butter. It consists of the milk remaining after the fat is removed. It is considered a pleasant and nutritious beverage.

**Butternut**, a large American tree belonging to the family Juglandacæ. The brown-husked, rugged nuts contain oil, and have a delicious flavor.

**Butter Tree**, a name applied to various tropical trees, the pulpy fruit and seeds of which yield a quantity of oily fat used by the natives of India and Africa as butter and lamp oil.

**Butterwort**, popular name of *Pinguicula*, a genus of plants belonging to the Bladderwort family.

**Butterworth**, **Hezekiah** (1839-1905), American author, wrote, several volumes of verse, and many short stories embodying the romance and legend of New England.

**Butt Joint**, a joint, usually between iron plates, in which the two plates are brought to

'abut' together, and are then fastened together by cover-plates.

**Buttons**, devices of various shapes and sizes used either as a means of fastening together parts of garments or for purely ornamental purposes. Originally buttons were the pure product of craftsmanship, but at present they are objects of mass factory production. See Albert's *Complete Button Book* (1949).

**Buttonwood**. See *Sycamore*.

**Buttress**, an abutment built outside a wall to relieve the latter of the outward thrust or pressure consequent on the weight of vault or arch. It has many forms, from that of a rectangular pier let into the wall, to that of a free, arch-like structure, or 'flying buttress.'



*Buttress and Flying Buttress.*

**Butuan**, pueblo, Mindanao, Philippine Islands. A monument has been erected here to Magellan, who landed on the site; p. about 22,190.

**Butyl Alcohol**, or **Butanol**, is known in four isomeric varieties, two of which are finding wide use as solvents. Normal butyl alcohol,  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ , is obtained in immense quantities, along with acetone and ethyl alcohol, by the fermentation of solutions of corn starch by *Clostridium acetobutylicum*. Tertiary butyl alcohol,  $(\text{CH}_3)_3\text{COH}$ , is made commercially from the gases obtained in cracking petroleum, and finds some use as a solvent.

**Butyl Chloral**,  $\text{CH}_3\text{CHClCCl}_2\text{CHO}$ , is prepared by passing chlorine through acetaldehyde.

**Butyric Acid**,  $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$ , is a fatty acid occurring in butter fat and in several vegetable fats and oils. It is soluble in water, and gives rise to a series of salts and esters, the butyrates.

**Butyric Ether**, or **Ester**, a general name for compounds formed from butyric acid by the substitution of an alkyl group for the hydrogen atom of the carboxyl group.

**Buxton**, market town, England, in Derby

shire, on the Wye; 22 m. s.e. of Manchester; as long been celebrated for its natural hot mineral springs and its fine bracing climate; p. 19,556.

**Buxton, Sydney Charles**, First Earl of Buxton (1853-1934), English politician and author. He introduced penny postage to the United States and the Canadian Magazine post, and was responsible for the Copyright Act of 1911. He was created a Viscount (of Newtimber) in 1914, and an Earl in 1920. His publications include: *Handbook to Political Questions*; *Political Manual*; *Finance and Politics*; an *Historical Study* 1783-1885; *Fishing and Shooting*.

**Buxtorf, Johann** (1564-1629), German Hebrew scholar. His earliest book was a manual of Biblical Hebrew, containing a grammar and a vocabulary (1602); the greatest of his works published during his lifetime was the folio Hebrew Bible. Consult Diestel's *Geschichte des alten Testaments in der Christlichen Kirche*; Kautzsch's *J. Buxtorf der Aeltere*.

**Buxtorf, Johann The Younger** (1599-1664), German Orientalist, extended his father's writings, notably *Lexicon Chaldaicum Talmudicum, et Rabbinicum* (1639) and *Concordantiae Bibliorum Hebraicorum* (1632). In 1629 he edited Maimonides' *More Nevochim*.

**Byas-Ballot, Christoph Heinrich Diedrich** (1817-90), Dutch meteorologist and mathematician. He discovered the law relating to atmospheric depressions known by his name and was the inventor of the aeroklino-scope (q.v.).

**Buzeu**, or **Buzau**, town and episcopal see, Roumania. It was the scene of desperate fighting in World War I, and was occupied by German forces in December 1916; p. 43,365.

**Buzzard**, a name applied to twenty or more species of birds of prey, widely distributed over the globe, constituting the subfamily Buteoninae. The so-called Turkey Buzzard is not a buzzard, but a vulture.

**Buzzards Bay**, an arm of the Atlantic Ocean indenting the southern coast of Massachusetts.

**Byblos**, a city of great antiquity on the Phœnician coast.

**By-law**, a local regulation or enactment made by a subordinate legislative authority.

**Bylini**, a name given to the heroic ballads of Russian popular poetry. Consult Rambaud's *La Russie Epique*; Ralston's *Russian Folk-Tales and Songs of the Russian People*.

**Byng, Julian Hedworth George**, First

**BARON BYNG OF VIMY** (1862-1935), British army officer and governor-general of Canada, entered the army in 1883 as a member of the 10th Royal Hussars. At the beginning of World War I General Byng was commanding the Third Cavalry Division that forced the Germans to retreat at Ypres. In 1921 he was appointed Governor-General of Canada.

**By-Products**, substances or results obtained in the operation of a specific process, in addition to the substance or result primarily sought. Today utilization of the by-products of manufacture is of great importance in all industries.

Some examples of industries, with their by-products are the following: **Coke and Gas Industry**.—Among the utilized by-products of the coke industry are gas, ammonia, and tar, all of which are wasted in coking coal in beehive ovens, but are recovered when by-product ovens are used.

**Iron and Steel**.—The principal by-products of the blast furnace used in the iron and steel industry are gas and slag. Up to the last decade, the gasses from blast furnaces were utilized to some extent in heating the 'stoves,' and burned to some extent under boilers, but much was wasted. They are now efficiently used in internal combustion engines for the production of power.

**Slaughtering and Meat Packing**.—The utilized by-products include albumen, bristles, blood, bones, fertilizers and fertilizer material, gelatin, grease, glue, hair, hides, hoofs, horns, intestines, pancreatin, parotid substances, pepsin, skins, thymus, thyroids, and wool. (See **PACKING INDUSTRY**.)

**Explosives and Coal-Tar Color Industries**.—In these industries mixtures of nitric and sulphuric acids, known as 'mixed acid,' are used to convert alcohols, such as glycerine, cellulose, starch, and the like, into esters, such as the so-called nitroglycerine, gun cotton, and nitro starch, or hydrocarbons and phenols, such as benzene, toluene, and 'carbolic acid,' into nitro-compounds, such as nitrobenzenes, nitrotoluenes, and nitrophenols—picric acid being the best known example of the latter compounds. There are produced as by-products nitrogen oxides. The nitrogen oxides are recovered by means of a solution of sodium hydroxide, whereby sodium nitrite is formed, and this product is largely used in the diazotization processes by which the nitro-compounds are converted into more advanced derivatives of benzene. The nitric acid is recovered from the spent

acid and converted into ammonium nitrate, which is largely used in compounding explosives, while the sulphuric acid is regained, concentrated, and again used in nitration.

**Natural Gas**.—In pumping natural gas from wells, through compression and expansion, with cooling, various petroleum hydrocarbons of the 'naphtha and gasoline' class are obtained as by-products.

**Petroleum Refining**.—Originally the product sought in this industry was kerosene, all of the residue of the substance going to form by-products, much of which was wasted. To-day several score of subsidiary products are obtained in this process.

**General**.—In brewing, the malt, after extraction, serves as food for cattle, the excess of yeast is available for baking, and the carbon dioxide set free in the fermentation can be collected and compressed for the manufacture of aerated waters. In distilling, the disposal of the 'burnt ale' is a serious question, the product being used for manure.

**Soap and candle works** produce quantities of glycerin and salt as by-products.

Chemists are attacking the problem of agriculture, in which 70 per cent of gross production goes to waste. See **CHEMURGY**.

See **BREWING; CANDLE; DISTILLATION; DYEING; SODIUM; SULPHURIC ACID; TAR; COAL TAR; SLAG; SOAP; SUGAR; WOOL**.

**Byrd, Harry Flood** (1887- ), American farmer and political leader, born in Virginia, brother of Richard Evelyn Byrd. He was governor of Virginia 1926-30, and U. S. senator, 1933- . He attacked fearlessly waste and extravagance in government,

**Byrd, Richard Evelyn** (1888- ), American aviator and explorer, was educated at the Virginia Military Academy, the University of Virginia and the United States Naval Academy, being graduated from the latter in 1912. After four years' sea service he took up the study of aviation and during World War I commanded the United States naval air forces in Canadian waters.

In 1925 he accompanied the MacMillan Expedition to Greenland, acting as flight commander. On May 9, 1926, with his pilot, Floyd Bennett, starting from Spitzbergen, he flew in a Fokker monoplane over the North Pole, covering 1360 miles in 15½ hours. For this flight he was awarded by President Coolidge the Hubbard Gold Medal. On June 29-July 1, 1927, he made a four-passenger flight from New York to Ver-sur-Mer, France, landing with great skill under dan-

gerous conditions, after a period of 43 hours and 20 minutes.

In the fall of 1928 he led a carefully equipped scientific expedition on a two-year trip to the Antarctic, establishing a base at a station which he named 'Little America,' from which he made several successful survey flights. On November 28, 1929, starting from this base, he, with three companions, flew a distance of some 500 miles, circled over the South Pole, and returned to the base the following day after having covered 1600 miles. (See ANTARCTIC). On December 21, 1929, he was awarded the rank of rear admiral in recognition of this flight. He has also been awarded the Congressional Medal of Honor, and the Flying Cross, and is a Commander of the Legion of Honor, France.

In October, 1933, a second Antarctic Expedition went out under his leadership, establishing its base at Little America and preparing for a second period of scientific exploration. During the summer of 1934 (the Antarctic winter) Rear Admiral Byrd established himself at a solitary base, 120 m. from headquarters, where he made daily meteorological observations in spite of serious illness. In 1939 he again went to Little America to remain two years, but he returned in 1940 and the expedition returned in 1941. He had charted 1,100 miles of newly discovered coastline. He conducted the fourth expedition under U. S. Navy auspices, in 1946-47. I mapped 845,000 sq. miles. Among his books are *Skyward* (1927); *Little America* (1930)

**Byrnes, James Francis** (1879- ), American jurist, b. Charleston, S. C. Member U. S. House of Representatives, 1911-25; U. S. senator, 1931-41; associate justice U. S. Supreme Court, 1941-42; Director of Economic Stabilization, 1942; Director of War Mobilization and Reconversion, 1943-5; Secretary of State 1945-47. He was active in the Berlin Conference, 1945. He was Gov. of S. C. 1951.

In 1954 he signed a Southern Governor's statement against desegregation.

**Byron, George Gordon Noel, Lord** (1788-1824), a poet and literary force of the nineteenth century. In 1812 he issued the first two cantos of *Childe Harold*—an immediate success. In 1815, he married Ann Isabella Milbanke, daughter of a wealthy Durham baronet. In January, 1816, with her daughter, Ada, she returned to her parents. The true cause of this separation has never been ascertained, but it was final. Byron then went abroad, and settled for a

time in Switzerland, where he wrote the third canto of *Childe Harold*, *The Prisoner of Chillon*, *The Siege of Corinth*, *Parisina*, *he Dream*, and part of *Manfred*. While in Switzerland Byron met the Shelleys; he then passed on to Venice, living successively in Ravenna, Pisa, and Genoa.

In 1817 he finished *Manfred*. The publication of *Don Juan* began in 1819, and continued for five years. To the *Liberal*, a Radical periodical conducted for a brief period by Leigh Hunt, Byron, and Shelley, Byron contributed *The Vision of Judgment*, a poetical parody upon a poem of that name by Southey. In 1823, *Heaven and Earth* appeared and *Werner* was published in 1822.

Resolved to aid the Greeks in their struggle for independence, Byron sailed from Genoa, and on Jan. 4, 1824, arrived at Missolonghi. His physical powers proved unequal to the strain, and after three months of strenuous effort he died of rheumatic fever.

The keynote of Byron's character was an extraordinary and egotistical sensitiveness, which was a contributory cause of many of his troubles, and everywhere finds expression in his verse. He was capable of great generosity and high feeling, misanthrope and cynic though he was in some of his moods.

The best edition of his works is *Complete Poetical Works*, ed. by P. E. More (1933); also his *Letters* (1933). Consult Drinkwater, John, *Pilgrim of Eternity* (1925); Maurois, André, *Byron* (1930).

**Byron, John** (1723-86), English vice-admiral, was grandfather of the poet. He accompanied Anson in his voyage round the world 1740-4. His views concerning the duties of the navy in connection with maritime exploration led to the voyages of Captain Cook.

**Byron Bay**, a wide bay on the eastern coast of Labrador.

**Bysmalith**, an intrusion of igneous rock reaching toward the surface as a kind of massive plug through the overlying beds.

**Byssus**, the silky threads by means of which many bivalves attach themselves to a firm surface.

**Byström, Johan Niklas** (1783-1848), Swedish sculptor. He executed the colossal statues of *Charles X.*, *Charles XI.*, *Charles XII.*, and *Gustavus Adolphus*.

**Byzantine Empire**. The formal foundation of the Eastern, or East Roman, or Byzantine empire took place in 395 A.D., when Theodosius the Great, at his death, perma-

nently divided the empire between his sons Arcadius and Honorius. To the share of Arcadius fell the Asiatic portions, together with Egypt, Thrace, Moesia, Macedonia, and Greece.

The emperors who succeeded Arcadius reorganized the army, making the native element more prominent. The consequence was that, while the Eastern was as much exposed as the Western empire to the barbarians, the

trators, was taken up with meeting the Slavic invasions; the empire was steadily going downhill.

The exhausting taxation under Justinian and his successors had paralyzed commerce and industry. Mainly through the former's example, despotism had become complete; laxity in morals among high and low accompanied the general impoverishment. Besides, the great Saracen invasion was at hand.

After the death, 641, of Heraclius things went from bad to worse; for a quarter of a century anarchy prevailed, and the empire lost most of its provinces in Asia to the Saracens, and in Europe to the Bulgarians, and was only saved from complete destruction by the energy and ability of Leo the Isaurian, one of the generals in the East, who in 716 seized the throne. Leo, and not Charles Martel, really saved Europe from the Saracens.

The history of the 8th century is chiefly remarkable for the controversy regarding image worship. The Byzantine Emperors



*Lord Byron.*

Eastern empire was preserved intact, while the Western was broken up. Arcadius had been nominally succeeded by Theodosius, 408-450, but really by Pulcheria, a sister of the young emperor. The three emperors who succeeded Pulcheria and Anastasius (491-518), carried the Eastern empire safely through the storms which proved fatal to the empire of the West.

On the death of Anastasius the sceptre passed to Justinus, and in 527 to his nephew Justinian, who reigned for thirty-eight years, and dominated his century. But in spite of the brilliance of his reign, the empire was in a depressed condition when he died, in 565. Personally he is most celebrated as a legislator for his codification of the laws; he is also notable as the supporter, though not the originator, of Byzantine architecture; but his foreign policy renders him not less noteworthy. His wife, Theodora, who had been an actress, and whom he married against the wishes of his uncle, Justinus, proved to be a capable helpmate and adviser.

The attention of Justinian's successors, Justinus II., 565-578, Tiberius 578-582, and Maurice, 582-602, all of them able adminis-



*Mosque of St. Sophia.*

trators made severe edicts against the use of images in worship. The bishops of the European provinces were profoundly alienated, and the controversy largely caused the separation of Italy from the Byzantine empire.

Meanwhile Crete and Sicily were lost to the Saracens, and the theological controversy was not brought to a close till the Council of Nice in 842 decided against the iconoclasts. So long as the Asiatic provinces supplied the emperors the controversy continued, and was not really ended till a European line, in the person of Basil the Macedonian (867-886),

ascended the throne, and the European iconoclasts triumphed. The Macedonian dynasty which began with Basil continued, with some short interruptions, till 1056. It ruled over an empire which was now solely an empire of the East. Down to 800 the West had, through the popes, acknowledged nominal dependence on the East; but when, in 800, Pope Leo III. crowned Charlemagne as Roman emperor, the division of East and West was firmly and permanently completed. A new and more formidable enemy was gathering strength in the East while the dribble of incompetent emperors continued through the 11th century. The Seljuk Turks became the most powerful of the Mohammedan powers in the 11th century. The forces of the empire, which should have been employed against the Seljuk Turks, were wasted in almost continuous civil wars; and may be regarded as the turning point in the history of the empire.

The Turks had reached the Hellespont, when the first crusade gave a much-needed relief. The Byzantine empire was too exhausted to make vigorous resistance, and would have fallen if the Latin and Teutonic Christians had not come to its relief.

The welter of obscure and incompetent emperors continued during the 12th century and the empire began the 13th century with a Latin occupation, 1204, by French and Venetian adventurers diverted from a crusade by the wily policy of Venice. The East never recovered from the anarchy of this time. Thus the crusades, though embodying the Christian loyalty and zeal of that day, and in part preserving the Byzantine empire against the Turks, were in part injurious to those they primarily defended.

The Eastern empire learned to regard its deliverers as enemies and the 4th Crusade, 1204, as an expedition for plunder.

In 1354 the Turks made their first permanent settlement in Europe by the capture of Gallipoli. In 1361 Adrianople was taken by Murad, but the capital remained for yet a century the sole remnant of the Eastern empire. In 1452 came the final capture of Constantinople.

The verdict of history has become more favorable to the Byzantine empire. It kept alive the tradition of classical learning during the dark ages in Western Europe, and it bequeathed to Eastern Europe a treasury of ideas and attainment in art, architecture, and

religious thought which has profoundly influenced the life of its governments and peoples. Consult Gibbon, Edward, *Decline and Fall of the Roman Empire*; Baynes, N. H., *The Byzantine Empire* (1926).

**BYZANTINE ARCHITECTURE.** The foundation of a new and magnificent city gave a great impulse to architecture; and the meeting of East and West, Pagan and Christian, Greek and Roman, developed a new style. The new style also exemplified the Gothic method of balancing thrusts by counter-thrusts instead of by dead weight. Four periods may be noted: (1) 328 to 527 A.D.; (2) 527 to the end of the 8th century; (3) 9th to the 12th century; (4) 1204 to 1453 A.D. In W. Europe copies of Byzantine churches may be found at Ravenna (St. Vitale), Venice (St. Mark's), and at Monreale near Palermo. Mosaic, especially glass mosaic—now being revived for mural decoration—was a strictly Byzantine art; so was enamelling, now the heritage of W. Europe. The Pala d'Oro at St. Mark's is of Byzantine origin. Ivory carving and jewelry were produced abundantly, miniature and fresco painting cultivated with success.

**BYZANTINE LITERATURE.** 'The peculiar indispensable service of Byzantine literature was the preservation of the language, philology, and archæology of Greece.'

Historians who wrote on universal history, or of their own city and its customs, are legion, and Gibbon is the only guide through a maze of names that include emperors, generals, and statesmen. Their works, first printed at Paris in thirty-six volumes by Labbé (1654-1711), and reprinted at Venice (1727-33), were incorporated in forty-eight volumes by Neibuhr and others, under the name *Corpus Scriptorum Historiæ Byzantinæ* (1828-53). See Harrison's *Byzantine History in the Early Middle Ages* (1900); Schlumberger's *L'Épopée Byzantine* (1896). Lethaby and Swainson's *A Study of Byzantine Building* (1894); Krumbacher's *Geschichte der Byzantinischen Literatur* (1897); Bayet's *L'Art Byzantin* (1892).

**Byzantium**, tn. on the Thracian Bosphorus—the forerunner of the modern Constantinople. Its excellent site caused the emperor Constantine to choose it for the capital of the Eastern empire in 330 A.D., when it was called Constantinopolis. See **BYZANTINE EMPIRE**.



**C.** Before the 3rd century B.C. there was no distinction between C and G; they were one letter, with the original value *g* and the later value *k*. After G came into use, C was left with the value *k*. With this sound it passed to Britain, and it is still so used in Welsh. But *k* is a sound very liable to change under the influence of a consonantal *i*, which tends to slip in after it (dialectic English *cyar*='car'). Hence C in the alphabets derived from the Latin (English, French, German, Italian, etc.) has acquired a number of different sounds, such as *tsh*, *ts*, *sh*, *s*. In the English name it is now pronounced *s*, and this is generally its sound before *e*, *i*, and *y*; it is a value largely due to French influence after the Norman conquest. Other English sounds are *z* and *sh* ('sacrifice,' 'officiate').

*Ch* is used in the alphabets derived from the Latin to express various sounds originating in *c=k*. Its principal English value is that found in 'church,' and is due to Old French influence. The modern French value also appears in English 'machine.' C, in music (called on the Continent *do* or *ut*), is the tonic of the 'natural' scale—that which has neither sharps nor flats. The key of C minor flattens E and A.

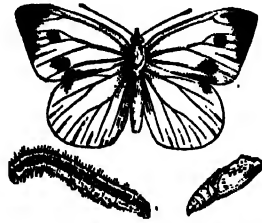
**Cab.** A kind of vehicle called a cabriolet was in existence about the middle of the 17th century in Paris. The original vehicle was a hooded gig on two wheels with room inside for only one passenger, beside whom sat the driver. In 1836 a cab on four wheels, the precursor of the brougham, was introduced, and from this the present four-wheeler is descended.

**Cabal**, a secret understanding between the members of a clique or party, and by transference denoting the clique itself. Charles II's cabinet was (1667-73) styled the 'Cabal', the initials of the noblemen forming the cabinet (Clifford, Ashley, Buckingham, Arlington, Lauderdale) made the word *cabal*.

**Caballero**, **Fernan**, pen-name of **CECILIA FRANCISCA JOSEFA BOHL DE FABER** (1796-1877), Spanish novelist, of German parentage, until recently one of the most popular

novelists in Spain and largely read in England. The *Cuadros de Costumbres Populares Andaluces*, is probably the most attractive book.

**Cabbage**, one of our most important vegetables. It is a native of Europe and is extensively grown in all temperate climates. It is eaten cooked in various ways, raw as a salad, and salted and cured as kraut.



*Cabbage Butterfly, with larva and pupa.*

**Cabbage Butterfly**, a large white butterfly.

**Cabbage Fly**, a dipterous insect which in appearance closely resembles the common house fly.



*Cabbage Fly, with larva and pupa.*

**Cabbage Palm**, or **Cabbage Tree**, a native of the W. Indies, where it often attains a height of 100 ft.

**Cabbala**, an ancient Jewish system of religious philosophy or theosophy, said to have been given by God to Adam. The Cabbala teaches the doctrine of the transmigration of souls, and has exercised great influence upon the intellectual development of the Jews.

**Cabeiri**, or **Cabiri**, ancient mystic divinities chiefly worshipped at Samothrace, Lemnos, and Imbros, but also at Thebes, Pergamos, and elsewhere.

**Cabell, James Branch** (1879- ), American author, was born in Richmond, Virginia. He was on the staff of the *New York Herald*, 1899-1901, and the *Richmond News*, 1901, and in 1902 began contributing to magazines and periodicals. His published works include *The Eagle's Shadow* (1904); *The Cream of the Jest* (1917); *Beyond Life* (1919); *Jurgen* (1919); *Figures of Earth*



*Cabbage Palm.*

(1921); *The Silver Stallion* (1926); *Special Delivery* (1933); *Smirt* (1934); *There Were Two Pirates* (1946).

**Caber, Tossing the**, a Scottish sport, in which a large beam or young tree, heavier at one end than the other, is held perpendicularly balanced against the chest, small end downward, and tossed so as to fall on the heavy end and turn over, the farthest toss and straightest fall winning.

**Cabet, Etienne** (1788-1856), French communist. In 1839 he was in Paris, where he published his *Histoire populaire de la révolution française* (1840), and *Voyage en Icarie* (1842). The latter, advocating utopian and communistic ideas, resulted in the emigration of a French colony to Texas in 1848.

**Cabinet**, the body of advisers to the head of a nation, who are usually charged also with the administration of various executive departments. The two principal types of

cabinet are well illustrated in the cabinets of the United States and Great Britain. The cabinet of the United States is composed of the heads of the executive departments, whose function is to advise the President upon important questions of policy, upon which advice he is under no legal obligation to act. The cabinet members are appointed by the President, and are subject to confirmation by the Senate; they are responsible only to the President, and they may be removed by him at will. The cabinet meets at the White House, at the call of the President; no records of the meetings are kept; and the proceedings are not officially made public.

While no provision was made in the Constitution for the creation of such a body, the establishment of executive departments was evidently assumed in the statement providing that the President might 'require the opinion in writing of the principal officers in each of the executive departments, upon any subject relating to their respective offices.' Congress, accordingly, in 1789 created the Departments of State, War, and the Treasury. Under John Adams the Secretary of the Navy has added to the cabinet. Jefferson developed the idea of systematic conferences, and emphasized party harmony, and during his administration the office of Postmaster-General was added. In 1849 the Secretary of the Interior joined the cabinet, in 1889 the Secretary of Agriculture, and in 1903 the Secretary of Commerce and Labor. In 1913 the Department of Commerce and Labor was divided into two departments, and their respective heads became members of the cabinet, bringing the total to ten.

The cabinet of Great Britain is composed of the chief Ministers of the Crown, who sit in the legislature, and who are jointly responsible for the government of the country. The prime minister is appointed by the Crown, and the other cabinet members by the prime minister. The responsibility of the cabinet is to the House of Commons, an adverse vote of which on an important matter leads to the resignation of the cabinet as a whole. Consult Blauvelt's *Development of Cabinet Government in England*; Bryce's *American Commonwealth* (revised ed.).

**Cabinet Noir**, a former French government department, engaged in opening private letters and reading them.

**Cable**, a large rope or chain of iron links, especially such as may be used for holding a vessel to her anchor. The term is sometimes used to signify a cable's length, 120

fathoms. For Submarine Cables, see TELEGRAPHY. See ANCHOR; CHAINS; ELECTRIC CABLES.

**Cable, George Washington** (1844-1925), American author, was born in New Orleans, of New England and Virginia stock. He served in the Confederate Army during the Civil War; and was afterward a member of the New Orleans *Picayune* staff, 1865-79. His literary reputation was established at this time by his sparkling and tender sketches of the Latin Quarter of New Orleans and of Southern plantation life, which first appeared in *Scribner's Monthly*. His published works include *Old Creole Days* (1880), a collection of his early sketches; *Kincaid's Battery* (1908); *Possom Jone' and Père Raphael* (1909); *Gideon's Band* (1914); *The Amateur Garden* (1914).

**Cabot, George** (1751-1823), American public official, was born in Salem, Mass. He was a member of the provincial congress of Massachusetts, 1776; and of the convention which ratified the Constitution of the United States. He was a leader of the Federal Party, and an advocate of strong centralized government. In 1814 he served as president of the Hartford Convention.

**Cabot, John, or Giovanni Cabotto** (c. 1450-98), discoverer of the North American mainland. Under letters patent from Henry VII. he sailed from Bristol in 1497, with two vessels, and on June 24 sighted Cape Breton Island and Nova Scotia. In 1498 he sailed again from Bristol; but of the fate of this expedition nothing more was ever heard.

**Cabot, Sebastian** (1474-1557), son of John Cabot. He is said to have accompanied his father on his first voyage of discovery, 1497, and in 1499 he appears to have sailed with two ships in search of a Northwest Passage. He was among the first to notice the variation of the magnetic needle in different places.

**Cabot Strait**, between Newfoundland and Cape Breton Island, forms an entrance to the Gulf of St. Lawrence.

**Cachalot, or Sperm Whale**, one of the largest of living animals, is commonest in tropical and sub-tropical seas, especially toward the south, and is absent from both Polar seas. The teeth of the cachalot furnish valuable ivory. Consult F. Beddard's *Book of Whales* (1900); and for a popular description of the hunting methods, see F. T. Bullen's *The Cruise of the 'Cachalot'* (1898).

**Cachexia**, a term usually applied to the general appearance, and especially the facial

expression, which is characteristic of certain chronic diseases.

**Cacholong**, also called mother-of-pearl opal, and sometimes Kalmuck agate, a variety of opal, usually gray in color, milk white, or bluish white, and resembling mother-of-pearl.

**Cacique, or Casique**, a title equivalent to prince or chief; confined to the native tribes of Hayti, Cuba, Mexico, Peru, and S. America.

**Cacodyl**, tetramethyl diarsine ( $\text{As}_2(\text{CH}_3)_4$ ), is a compound prepared by heating cacodyl chloride with zinc.

**Cacomistle**, a small animal of Mexico and adjacent parts of the United States known to Americans as 'civet-cat.'



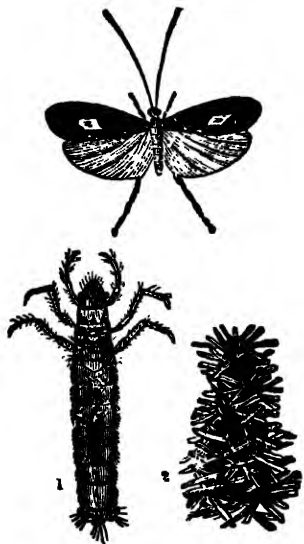
*Barrel Cactus, American Desert.*

**Cactus.** With very few exceptions, the cacti, to the number of 1,000 species, are natives solely of America. They are succulent plants, with small, awl-shaped deciduous leaves, and stem-joints which are flat or cylindric, and often appear to be leaves. Vivid flowers and fruits are borne on these joints. They are usually armed with many spines. For a description of the Spineless Cactus, see BURBANK.

**Cacus**, a son of Vulcan, inhabited a cave in the Aventine Mount, one of the seven hills of Rome.

**Cada Mosto, Alois, or Luigi da** (1432-77), a Venetian who explored the west coast of Africa as far south as the Rio Grande, discovering, 1457, Cape Verde Islands. His narrative has been translated into French. *Rélation des Voyages à la Côte, Occidentale d'Afrique d'A. de Cada Mosto* (1897).

**Caddis-flies**, insects regarded as forming the order Trichoptera. See Needham, *Aquatic Insects of the Adirondacks* (1901); W. S. Furneaux's *Life in Ponds and Streams* (1896).



*Caddis-fly.* 1, Larva; 2, Case of larva.

**Cade, Jack** (d. 1450), the leader of the Kentish insurgents of 1450, who were roused to arms by the fiscal exactions of the royal officials. The insurgents constituted a well-organized force, and utterly defeated the detachment of the royal army sent against them by King Henry VI., who was obliged to retreat upon London, and, a few days later, to Kenilworth. Thereupon Cade took possession, on July 2, of London, where he was received favorably by the citizens. A reward being offered for the capture of Cade, he was taken prisoner on July 12, but died from wounds received in the struggle.

**Cadell, Robert** (1788-1849), Scottish publisher, born at Cockenzie, Scotland; chosen by Scott in 1825, as the sole publisher of his

subsequent novels. See Lockhart's *Life of Scott*.

**Cadenabbia**, vil. and health resort, Italy. Here is the beautiful Villa Carlotta adorned with sculptures by Thorwaldsen and Canova.

**Cadence**, in music, is the name given to the closing—usually last two—chords of a phrase. The many varieties of cadence may all be classified as forms of perfect, imperfect, or interrupted cadences.

**Cadency**, that department of heraldry which treats of the symbols borne on their shields by the younger members and branches of a family. See **HERALDRY**.

**Cadenza**, in music, an ornamental passage introduced before the close of a section of a musical composition.

**Cadet**, originally a younger son; now a pupil in a military school, as the U. S. Military Academy at West Point.

**Cadi**, or **Kadi**, a judge of first instance under the Mohammedan system of law, possessing both civil and criminal jurisdiction.

**Cadiz**, province, Southern Spain; one of the richest and busiest in the kingdom, including the great peninsular city of Cadiz, and the important commercial centres of Jerez, San Lucar, Puerto de Santa Maria, and San Fernando. Manufacturing is actively carried on; p. 709,740.

**Cadiz**, city, Spain, capital of the province of Cadiz. The harbor is spacious and strongly fortified and contains the arsenal of San Fernando. Features of interest are the two cathedrals, one of the 16th and one of the 18th century; the Alameda de Apodaca, a beautiful promenade on the water front; the Parque Genoves; the church of Santa Catalina, containing Murillo's *Marriage of St. Catharine*. Cadiz was founded by the Phœnicians in 1100 B.C. It passed to the Carthaginians about 500 B.C. and was captured by the Romans after the Second Punic War. In the 5th century it was occupied by the Goths and in 1262 was taken by the Christians, and in 1596 the city was sacked and ruined by Essex. It was here that the liberal constitution of 1812 was proclaimed; p. 96,556.

**Cadiz, Battle of.** On July 21, 1640, at about fifteen leagues from Cadiz, a French squadron, under Armand de Brézé, defeated a Spanish convoy.

**Cadiz, Bay of**, an inlet of the Atlantic Ocean on the southern coast of Spain.

**Cadman, Charles Wakefield** (1881-1946), American composer. In addition to piano pieces, chamber music, and orchestral selections, his works include *American Indian*

*Songs* and *A Witch of Salem*, produced by the Chicago Civic Opera Company in 1926.

**Cadman, S. Parkes** (1864-1936), American clergyman, author, and lecturer, was born in Wellington, Shropshire, England, and came to America about 1890. He was lecturer on the Shepard, Carew, and Cole Foundations at Bangor, Hartford, and Vanderbilt University Theological Seminaries. He acquired wide popularity both as a lecturer and preacher. post in which he exercised national leadership of the Protestant church for years. His Sunday radio sermons won him a national audience, to which he appealed also through widely syndicated newspaper writings.

**Cadmium**, a metallic element, compounds of which occur in small quantities associated with zinc.

**Cadmus**, son of Agenor, king of Phœnicia, and brother of Europa, who was carried away by Jupiter disguised as a bull.

**Cadorna, Count Luigi** (1850-1928), Italian General who became commander-in-chief of his nation's forces when Italy entered the World War. Historians have held him chiefly responsible for the disastrous defeat of the Italians by the Austrians at Caporetto in October, 1917, when his army was driven back to the Piave River with 320,000 killed and 250,000 taken prisoners. He was succeeded as commander-in-chief by General Diaz. His own account of the battle is contained in his book, *La Guerre alle Fronte Italiana*.

**Cadoudal, Georges** (1771-1804), French royalist leader, the most brilliant figure in the Chouan War. His arrest for conspiracy against Napoleon, at Paris, on March 9, 1804, was followed by his execution on June 25.

**Caduceus**, originally an enchanter's wand, and later a herald's staff, is most familiar in the hands of Hermes.

**Cæcilius Statius**, a Roman comic poet, a native of Milan, and originally a slave.

**Cæcum**, a dilatation, about 2½ inches long, at the junction of the small and large intestines.

**Cædmon**, English poet of the 7th century, about whose life little is known.

**Cæn**, city, France, capital of the department of Calvados, on the river Orne; famous centre for the study of Norman art, having two of the finest Romanesque churches in France. In 1417 it was captured by Henry v. and remained in English hands until 1450; p. 53, 743.

**Cærlæon**, town, England, in Monmouthshire, on the river Usk; *Britannia Secunda*

(Wales). Numerous Roman remains have been found here, and a large mound known as King Arthur's Round Table.

**Cæsalpinia**, a genus of beautiful tropical leguminous trees and shrubs of some economic importance by reason of the tanning material and dyes obtained from them.

**Cæsalpinus, Andreas** (1519-1603), Italian botanist, was born in Arezzo, and became professor of botany at Pisa. Linnæus made considerable use of his *De Plantis Libri XVI* in framing his artificial system.

**Cæsar**, the cognomen of a famous Roman family of the Julian clan. It was of patrician rank, and claimed to trace its descent back to Iulus, the son of Æneas. Augustus took the name as the adopted son of Julius Cæsar, and from him it passed to Tiberius, Caligula, Claudius, and Nero, who were all by descent or adoption connected with the family. Later emperors also used the title, prefixing it to their own names.

**Cæsar, Gaius Julius** (102-44 B.C.), the great Roman dictator, was born on July 12, probably in the year 102 B.C. He was made priest of Jupiter in 87 B.C., by Marius, the husband of his aunt, Julia; and this connection with the head of the popular party marked him out as a leader of the people, a position which was strengthened by his marriage (83 B.C.) with Cornelia, daughter of Cinna, Marius' successor in the popular leadership. In 68 Cornelia died, and in 67 Cæsar married Pompeia, daughter of Q. Pompeius Rufus and granddaughter of Sulla.

He was prætor in 62, and in the next year went as proprætor to Farther Spain. He was elected consul for 59 B.C., and in that year formed with Pompey and Crassus the first triumvirate. He subdued the whole of Transalpine Gaul. In 55 he invaded Britain for the first time. In 55 a new arrangement with Pompey and Crassus had secured for Cæsar the extension of his command for five more years—from Jan. 1, 53, to Dec. 30, 49. Cæsar, determined to obtain a position at least equal to Pompey's, demanded election as consul for the year 48 in absence, while he still held power as governor of Gaul. This, however, was opposed by the senate, and in consequence Cæsar crossed the Rubicon, on or about Jan. 12, 49, with the words, *Iacta est alea* ('The die is cast'). Pompey's troops flocked to his command; he was welcomed everywhere; and after pursuing Pompey and his adherents to Brundisium, whence they sailed to Greece, he set out for Spain, where he defeated Pompey's armies.

Returning to Rome, where he had been appointed dictator, he held the consular elections and was himself elected consul for 48. On August, 9. Pompey fled to Egypt, but was murdered before Cæsar reached there.

Upon Cæsar's arrival in Egypt he became involved in a war against the guardians of the young king, Ptolemy, in behalf of the rights of the latter's sister Cleopatra. This war was brought to a close in March, 47, and Cæsar next marched through Syria and Asia Minor. He reached Rome in September, 47; sailed before the end of the month to Africa, and on April 6, 46, defeated the Pompeians, under Scipio and Cato, at Thapsus. He now returned to Rome, undisputed master of the Roman world. But his power and influence had made him an object of jealousy and suspicion, and already the conspiracy against his life had been formed. Cassius was ring-leader, and Marcus and Decimus Brutus, Casca, and sixty others were implicated. Although Cæsar received many warnings, he neglected them all, and met his fate in the senate house on the Ides (15th) of March, 44. Casca struck the first blow. Cæsar resisted, until Marcus Brutus also smote him; then, with the words, *Et tu, Brutel* ('Even thou, Brutus!') he fell.

Cæsar's honesty, his patriotism, his devotion to the welfare of the poorer classes and the provincials, his unprecedented moderation toward his opponents, his extraordinary power of work, his statesmanship, and his eloquence are testified to by both his friends and enemies. As an author, he was placed in the highest rank by his contemporaries. His only extant work is the *Commentaries*, or *Diary of the War in Gaul* (the books on the civil and African war usually attached to it are not his). Editions of the *Commentaries* are innumerable; especially good are *The Civil Wars*, Latin text with tr. by A. G. Peskett (1914) and *The Gallic War*, Latin text with tr. by H. J. Edwards (1917).

Consult Fowler, W. W., *Julius Cæsar* (new ed. 1925); Ferrero, Guglielmo, *Life of Cæsar* (1933); Froude, J. A., *Cæsar; a Sketch* (repr. 1937); Buchan, John, *Julius Cæsar* (repr. 1938).

**Cæsarea**, now **Kaisarieh**, a name given to several ancient cities.

**Cæsarean Section**, the procedure for delivery of the fetus by means of an incision through the abdominal and uterine walls instead of by the natural route. The operation is an exceedingly ancient one, taking its

name from Julius Cæsar, who is said to have been thus born.

**Cæsium**, an alkaline metal discovered by Bunsen in 1860, by spectral analysis, in the mineral water of Dürkheim, in the Palatinate.

**Cæsura**, a metrical pause in the middle of a line of verse, generally defined as the point at which a reader would pause to gather breath.

**Cafeteria**, an eating house in which the patrons wait upon themselves.

**Caffeine**, **Theine** or **Methyl-Theobromine**, an alkaloid which forms the stimulating principle in coffee, tea, in the S. American *maté* and in the kola nut of Africa.

**Cagayan**, prov., Luzon, Philippines; Area, with dependent isls., 5,291 sq. m. The province is scarcely rivalled in the production of tobacco; p. 311,088.

**Cage-birds** are birds kept for the sake of their beautiful plumage, their agreeable song, their lively disposition, or for the interesting study of their habits. The favorite cage-birds are the songsters. Among birds remarkable for the beauty of their plumage are the parrots, parakeets, and cockatoos.

**Cagliari**, tn., and cap. of prov. of Sardinia. Among the more important buildings are the citadel (13th century), the university (1596), the cathedral (14th century). The town also possesses a Roman amphitheatre, and Carthaginian-Roman necropolis; p. 136,655.

**Cagliostro**, **Alessandro**, Count (1743-95), an *alias* of Giuseppe Balsamo. After a wild youth he left his native Palermo, and in company with Althotas, a Greek chemist, travelled through the Archipelago, till the latter died at Rhodes. At Strassburg, 1780, he gained notoriety by his cures, and by vending the 'elixir of life.' In London he established a cult of freemasonry (Egyptian), but had to flee to Paris. Here he revived his Egyptian cult, adding the lodge 'Isis.' Venturing to Rome, 1789, he was tried, 1790, for freemasonry and sorcery, and imprisoned first at San Angelo, then at San Leone, in the duchy of Urbino, where he died. His *Life*, compiled from his trial, was published at Rome, 1791.

**Cagnola**, **Luigi**, **Marquis** (1762-1833), Italian architect. His works include the magnificent triumphal arch, Arco della Pace, the chapel of St. Marcellina in the church of Sant' Ambrogio, and the Porta di Marengo, all at Milan.

**Cagots**, the French name for an outcast people in the Western Pyrenees.

**Cahors**, cap. of dep. Lot, France, has a Romano-Byzantine cathedral and the palace of Pope John xxii. Clément Marot was born here in 1495, and Gambetta in 1838; p. 15,345.

**Caicos and Turk's Islands**, isls. s. of Bahamas, W. Indies, are under the government of Jamaica; consist of more than thirty small cays, of which only eight are inhabited; p. about 5,270.

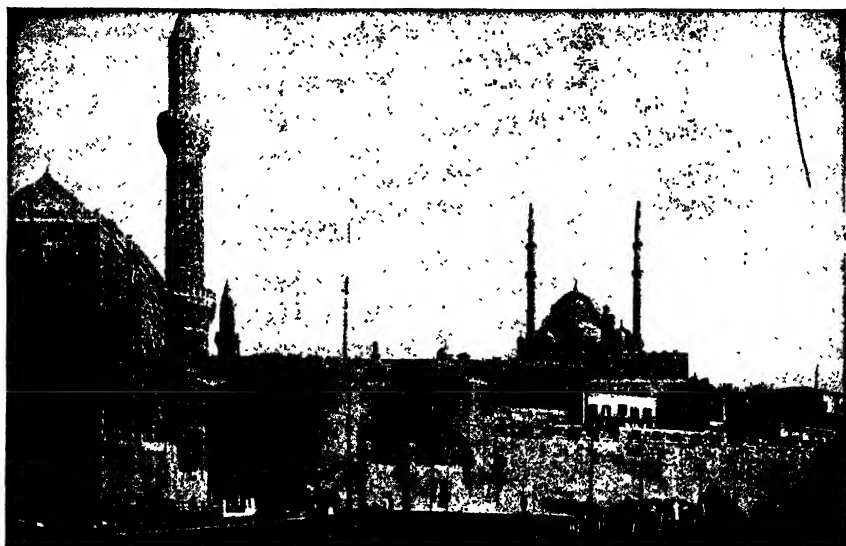
**Caillaux, Joseph Marie Auguste** (1863-1944), French statesman, minister of finance 1899-1902, and again in Clemenceau's first

explorer; during an expedition to Egypt in 1815 he succeeded in locating the ancient emerald mines of Jebel Zubara, and made other important archæological discoveries in the oases of Siwah. See his *Voyage à Méroé au Fleuve Blanc*, etc. (1826-7).

**Caiman**, a name given to five species of alligator found in Central and S. America.

**Cain**, the first-born of Adam and Eve. He became a husbandman, and slew his shepherd brother Abel.

**Caine, Sir Thomas Henry Hall** (1853-1931), novelist and dramatist. A most pro-



From Publishers Photo Service.

Cairo, Egypt.

The Citadel, said to have been built in 1179, and the Mosque of Mohammed Ali.

ministry, 1906. Shortly after the outbreak of World War I Caillaux was sent on a mission to South America. Charges of 'defeatism' and treason were raised against him in his absence. Clemenceau turned fiercely on Caillaux, caused his arrest in 1918 and he was held until his trial in 1920. Though more than half acquitted, Caillaux was sentenced to three years' imprisonment, loss of civic rights, restricted residence, and costs. Having already spent over two years in jail, he was immediately released. Amnestied in 1924, he was elected a senator and twice again served as finance minister, besides acting as financial envoy to Great Britain and United States.

**Caillaud, Frédéric** (1787-1869), French

lific writer, his works include *Sonnets of Three Centuries*, *Recollections of Rosetti* (1881), *Life of Coleridge*, *The Shadow of a Crime* (1885), *A Son of Hagar* (1887), *Capt'n Davy's Honeymoon* (1892), and *The Prodigal Son* (1904).

**Ca'ing Whale, Pilot Whale, or Black-fish**, a cetacean about twenty feet in length, common in the N. Atlantic, and perhaps identical with similar cetaceans of southern seas.

**Cainites**, a Gnostic sect, agreeing generally with the Ophites. Their distinctive feature seems to have been their approbation of the black sheep of Scripture.

**Ca ira** ('It will go on'), a popular French

song of 1789. The words were by Ladré, a street singer; the air was by Bécourt, an obscure musician.

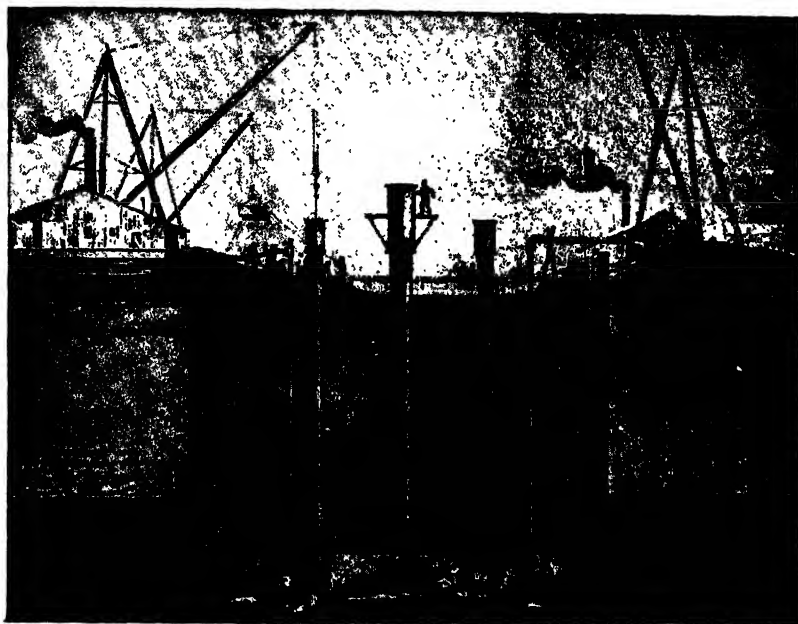
**Caird, John** (1820-98), Scottish theologian. In 1855 he preached before Queen Victoria the famous sermon 'Religion in Common Life,' which gave him a world-wide reputation. Caird's Gifford lectures, with a Memoir, were published in 1900 as *The Fundamental Ideas of Christianity*.

**Cairn**, in archæology, a mound of stones raised over prehistoric interments, particular-

ly common in Scotland and Wales, and akin to the English barrow. Consult Anderson's *Scotland in Pagan Times: the Bronze and Stone Ages*.

**Cairngorm**, brown, yellow, and smoky varieties of quartz obtained principally near the Cairngorm, a summit of the Grampians, Scotland.

**Cairo**, capital of Egypt, largest city in Africa, and an archiepiscopal see, is situated on the right bank of the Nile. The city of Cairo consists of two main sections, the Arab



*Pneumatic Caisson: Vertical Section of a Caisson during the Sinking Process.*

This shows the men at the bottom in the working chamber, which is full of compressed air which keeps out the water. In the middle is the vertical pipe or tube, with an air-lock at the top, through which the men pass to and from the outer air, and the working chamber. The lock-tender on his platform may be seen and a man entering the lower door of the lock. On either side of the man shaft are the shafts through which the excavated material is hoisted to the surface. Each of these has an air lock at the top. Next to these shafts are the blow-out pipes, through which fine material, such as sand, can be blown out to the surface by the compressed air when a valve is opened. The derrick scow on the right is hoisting a bucket of excavated ground or 'muck'; that on the left has the bucket in the working chamber, where the men are filling it. A derrick on the left, in the background, is delivering a 'skip' of concrete to the men who are filling the 'crib' or 'cofferdam' of the caisson with concrete, thus adding to its weight and helping it to sink. When the lower edge (the cutting edge) of the caisson has reached the bed rock, it is sealed tightly with clay or sacks of cement. Then the working space is filled solid with concrete, the shaftways are next filled, and the result is a solid mass of concrete, forming an artificial island on which the pier of a bridge may be founded. (Courtesy of Ralob Modjeski, Delaware River Bridge Joint Commission).



or native quarters, and the modern or foreign quarter known as Ismailiyeh. There is an opera house, the khedive's palace, and army barracks; the fashionable quarter, the seat of foreign trade, has hotels, banks, English churches, consulates, and theatres. The finest of the city's many mosques is the Jami Sultan Hassan, built in 1356-9. The chief educational institution is the university, converted from the mosque of el-Azhar in 988. There are also the Université Egyptienne, many English schools, missionary schools, schools of art and medicine, and the Khedival Library containing more than 75,000 volumes, many of great rarity and value; p. 2,100,506.

When Amr-ibn-el-As conquered Egypt in 640 A.D., he built a town upon the site of the Roman Babylon and called it El-Fostât. This town gradually spread until it extended to the citadel, where Ahmed-ibn-Tulun erected a new town called El-Kata'i. Gôhar, in 969 A.D. erected the present town n. of El-Kata'i. It prospered and grew until the 14th century, when it reached its zenith. On Jan. 26, 1517, was seized by the Turks. Bonaparte occupied the city in 1800, but in 1801 the French garrison was forced to capitulate to the grand vizier. Under Mehemet Ali, Cairo began to assume its present modern aspect. See EGYPT. Consult Bénédict's *Cairo and its Environs*; Sladen's *Oriental Cairo* (1911).

**Cairo Conference.** See **United States Conferences.**

**Cairolì, Benedetto** (1825-89), Italian soldier and statesman, was born in Pavia. He was with Garibaldi in Sicily. He became leader of his party when the Left came into power, 1876, and the following year, on the fall of the Depretis-Nicotera ministry, formed a new cabinet. In 1878 he was severely wounded while endeavoring to protect King Humbert from attempted assassination. In 1879 he formed a coalition ministry with Depretis, retaining for himself the premiership and the foreign office, but because of the unpopularity of his policy in regard to the conduct of affairs in Tunis, he resigned in 1881.

**Caisson**, 'box,' a term used in military circles for a case to hold ammunition or a cart on which the ammunition for a field gun is transported; and in civil engineering with several meanings, as follows:

(a) The gates which close the entrances to dry or graving docks used for the inspection and repair of hulls of ships.

(b) To raise or float sunken vessels, a platform fitted with hollow chambers which

may be filled with water or emptied at will is sometimes used. This is termed a caisson or pontoon.

(c) In building dock walls, harbor walls, or breakwaters, hollow boxes with bottom and four sides and open at the top have been used and termed caissons.

(d) A well or open caisson is used for making foundations for buildings or bridges. The caisson consists of a vertical hollow box, open at both ends, with a sharp cutting edge of steel or hard wood at the bottom. It is sunk through the ground by excavating within it, the box sinking as the excavation proceeds. When the caisson has been sunk to the depth required, it is filled with concrete.

(e) The hydraulic caisson is used for putting down foundations in ground which can be washed out, or jetted, with water under pressure. A caisson of this type consists of a cylindrical steel shell, to the bottom end of which is attached a heavy iron cutting edge of hollow triangular section with a series of small holes along its lower edge. This hollow edge is connected by pipes with a force pump on the surface. In sinking, water from the pump is forced through the cutting edge and escapes through the small holes. This washes the ground away from under the cutting edge, and the cylinder is sunk by weighting it on the top. As it sinks, successive lengths are added at the top. When the cylinder has reached the full depth, it is filled with concrete, in the dry if it is possible to pump out the water; if not, by tremie under water.

(f) The principle of the pneumatic caisson is as follows: Water exerts a pressure of 0.4335 lb. per square inch on any point for every ft. of depth which that point lies below the surface of the water. The pressure is directly proportional to the depth or head. If, at the bottom of a caisson being sunk through water-bearing ground, air can be placed, which has been compressed to a pressure, in excess of that of the normal atmosphere, equal to that due to the head of water at the bottom of the caisson, a perfect resistance is interposed to the flow of water, carrying the ground with it, into the bottom of the caisson, and the excavation may be done in the dry and without the movement of the surrounding earth into the caisson. In order to introduce the compressed air to the bottom of the caisson and to hold it there, a solid air-tight floor or deck is built across and toward the bottom of what would be, otherwise, an open caisson. This deck is high enough above the bottom for a man to stand

upright. Through the floor means of access for men and materials are provided, as well as pipes connected with air-compressing machinery on the surface. As the caisson descends, the hydraulic head increases and consequently the pressure of the air introduced into the space, the air chamber or working chamber, below the air-tight floor must be increased.

The history of the pneumatic caisson dates back to 1778, when Smeaton used a pump to introduce fresh air at pressure into a diving bell being used in repairing the foundations of a bridge at Hexham, across the River Tyne, England. In the 1870's, there was a great boom in railroad building in the United States involving the bridging of such rivers as the Mississippi and the Missouri. The piers for these bridges were sunk by caissons under compressed air. The number of caissons sunk for bridge piers is now very great, some of them running to large size.

The first use of pneumatic caissons to form the foundations of a building was in 1893, for the Manhattan Life Building. Since then hundreds of buildings have had their foundations made in this way, and thousands of caissons have been sunk for this purpose. Sometimes the caisson is built to its full height before sinking is begun. Sometimes it is built up, section by section, as the downward excavation proceeds and the caisson sinks. The cofferdam may be of wood, structural steel, or reinforced concrete. Giving access for men and materials between the working chamber and the open air, is the air shaft. This is a vertical pipe or tube provided with a ladderway and extending the whole height of the caisson. Its lower end passes through the air-tight floor or deck; the upper end terminates in the air lock. This is a steel vertical cylinder provided at each end with a door which may be closed against the air pressure. In coming out of the air, locking-out, the lower door of the lock is open and the upper one is closed. The men enter the air lock, close the lower door, and then open a valve within the lock which permits the compressed air inside the lock to escape until the pressure is reduced to that of the normal atmosphere. The upper door now may be opened and the men pass out. Locking-in is the reverse process. If the caisson gets hung up, if it does not settle after a depth of excavation has been made, the pressure of the air in the working chamber is allowed to blow-out, it is reduced a few pounds. This usually starts

it. Sometimes, caissons have sunk so rapidly that the whole chamber has been filled with earth, forcing the men to flee up the air shaft. The air or working chamber remains unfilled until the caisson has been sunk to its final depth. Then it is filled solidly with concrete up to the roof by means of concrete passed down through the shaft. After the working chamber has been filled, the air shaft and other passageways, or other vertical openings through the caisson may be filled so that the finished structure is a solid mass of masonry. An important development in the application of caissons to tall buildings is that whereby the caissons which support the outside wall columns have been made to form a continuous water-tight wall or dam sealed into the rock and enclosing the whole area of the building. In the Federal Reserve Bank Building, 1922, in New York City, the area enclosed is 182,000 sq. ft., and the volume 2,912,000 cubic ft. The lowest floor is 80 ft., and the deepest pier is 118 ft. below the sidewalk.

Another use of caissons is to provide a foundation for dams. A most notable example is that of the Hales Bar Dam across the Tennessee River near Chattanooga. This dam is founded on a limestone rock so honeycombed with caverns that secure foundations appeared impossible until pneumatic caissons were applied. It is becoming the practice to sink large caissons formed of structural steel across the line of shield-driven tunnels to be driven across and under a river or other waterway. Noteworthy examples of this type of caisson are those used on the Holland Tunnel (1921-6) for vehicular traffic across the Hudson River, between New York City and Jersey City.

*Bibliography.*—Consult W. W. Patton's *Foundations* (2d ed. 1909); Jacoby and Davis' *Foundations of Bridges and Buildings* (1914); Hool and Kinne's *Foundations, Abutments and Footings* (1923).

**Caisson Disease**, known also as **Bends** and as **Diver's Palsy**, a disease due to the effects of compressed air, occurring among divers and workers in tunnels and caissons.

**Caius**, John (1510-73), English physician, best known by this Latinized form of his surname, Key. In 1557 he refounded Gonville Hall, Cambridge, which henceforth was known as 'Gonville and Caius College.'

**Cajamarca**, city, Peru; an ancient Inca city and in the neighborhood are the thermal 'Baths of the Incas'; p. about 18,324.

**Cajuput**, an evergreen tree, bearing pen-

dulous spikes of white flowers, found throughout Australia and South Asia, known in the former country as the tea tree.

**Cajetan, Jacopo**, known in religion as **TOMASO DE VIO DI GAETA** (1469-1534), Italian theologian, was born in Gaeta (Cajeta). He entered the order of the Dominicans in 1484. He was a steadfast opponent of the Reformation. His works include a translation of the Bible, and commentaries upon portions of Aristotle and Aquinas.

**Calabar Bean**, the poisonous seed of *Physostigma venenosum*, a shrub native to Western Africa, bearing violet-colored flowers and flattened pointed pods, each containing two or three of the reddish brown seeds or beans. The seed contains two alkaloids—calabarine and physostigmine or eserine.

**Calabash**, the hard shell of the fruit of the calabash tree of the order Bignoniaceæ, native to West Africa, Tropical America, and the West Indies.

**Calabozo**, town, Venezuela, capital of the state of Guárico, on the Guárico River; 120 m. s.w. of Caracas; p. 8,000.

**Calabria**, a territorial division of Southern Italy, comprising the provinces of Cantanzaro, Cosenza, and Reggio. Marble, alabaster, salt, and copper are found, and grain, fruit, hemp, and flax grow in abundance; p. 1,503,201. Calabria (formerly Bruti) was colonized by the Greeks in the 8th century B.C. In the Middle Ages, it fell into the power of the Saracens, who in the 11th century were expelled by the Sicilian Normans. Henceforth Calabria was governed by Naples. In 1763, 1905, and 1908, stupendous earthquakes occurred in the district.

**Caladium**, a genus of plants belonging to the family Araceæ.

**Calais**, seaport town and fortress, France, in the department Pas-de-Calais, on the Strait of Dover, 21 m. e. of Dover, England, on the opposite shore; the chief port for passenger traffic between England and the continent. It is an important fishing centre, and has extensive manufactures of lace and tulle; p. 50,048. In World War I Calais was an important British base for supplies.

**Calais**, city and port of entry, Maine, in Washington co., on the St. Croix River, at the head of tidewater, 12 m. from Passamaquoddy Bay; the most northeasterly seaport in the United States; p. 4,589.

**Calamander Wood**, the wood of a tree native to India and Ceylon, used as a cabinet wood and valued for its beauty.

**Calamianes, or Culion Islands**, group of

islands, Philippines, in Palawan province, lying between the Mindoro and the China Seas and forming a connecting chain from Mindoro to Palawan. There are 98 islands in the group, with an area of 677 sq.m.; p. 17,000.

**Calamine**, a name given to two common ores of zinc—the one being a hydrous silicate, hemimorphite, or electric calamine; the other the carbonate, more properly known as smithsonite. Both are frequent in veins which carry zinc blende.

**Calamint**, a genus of plants belonging to the order Labiata, much resembling the thymes and sages.

**Calamite**, a well-known plant fossil which occurs in Carboniferous strata, and in external appearance, somewhat resembles a reed. It is an extinct representative of the group Equisetaceæ.

**Calamus**, a genus of Asiatic palms, all the species of which, some scandent, are of great beauty.

**Calandrinia**, a genus of plants of the rock purslane order (Portulacæ). There are about sixty species.

**Calanthe**, a genus of terrestrial orchids having broad, plaited leaves and long spikes of large white, lilac, or pink flowers. Some species are deciduous and some evergreen; the greater number of varieties grown by horticulturists are hybrids obtained by artificial crossing.

**Calas, Jean** (1698-1762), Protestant merchant of Toulouse, was accused of having strangled his son Mark Antony, to prevent him from abjuring Protestantism and adopting Roman Catholicism. On this charge the old father was condemned to be tortured and broken on the wheel. Consult Meyer, A. E., *Voltaire: Man of Justice* (1945).

**Calash**, a light four-wheeled carriage with a folding roof or hood.

**Calatafimi**, town, Trapani province, Sicily. In the vicinity are the ruins of the ancient *Segesta*; and about 2 m. to the s.w. Garibaldi defeated the Neapolitans in 1860; p. 10,500.

**Calathea**, an American group of plants of the ginger family.

**Calatrava la Vieja**, a ruined city of Spain, on the Guadiana, 12 m. n.e. of Ciudad Real. Its defence against the Moors, in 1158, after it had been abandoned by the Templars, is famous on account of its having originated the Order of the Knights of Calatrava.

**Calauria**, a small island (now Poros) in the Saronic Gulf (now Gulf of *Ægina*). Greece.

**Calaveras Skull**, a fossil skull found in the auriferous gravels of Calaveras co., California, in 1866, and believed by some to belong to the Tertiary period, thus indicating the presence of Tertiary man in that region.

**Calcaire Grossier**, a richly fossiliferous series of limestones and marls which are developed in the Paris basin, and belong to the middle Eocene period.

**Calcareo**, or **Calcispongios**, the group of sponges in which the skeleton consists of spicules of lime. See SPONGES.

**Calcareous**, in chemistry, is a term applied to substances containing much lime.

**Calcareous Rocks** consist of carbonate of lime, whether in the form of calcite or aragonite. The majority have been formed in the sea, and are composed of the remains of marine animals, such as corals, crinoids, brachiopods, molluscs, echinoderms, and foraminifera.

Another series of calcareous rocks is crystalline, and may be called the marbles, as marble is a typical example. They are associated usually with the crystalline schists and with the contact rocks which are developed by the action of the heat, given out by great masses of granite as they cool, on the rocks surrounding them.

**Calcareous Soils**. Most highly calcareous soils are not noted for their fertility or agricultural value. They are apt to be very thin, and full of hard nodules of flint, the insoluble ingredients of the chalk or limestone beneath, and are more adapted for sheep pasture than for growing grain. See SOILS.

**Calcasieu**, river of Louisiana, draining the southwest corner of the State. The river is 230 m. long, and is navigable for boats of light draught.

**Calceola**, or **Slipper Coral**, a characteristic fossil of the middle Devonian.

**Calceolaria**, a genus of plants, natives of South America, Mexico, and the West Indies, belonging to the order Scrophulariaceæ. The saccate flowers of *Calceolaria* resemble 'lady's slippers,' and are variously spotted and colored, with rich hues, generally combined with yellow. They occur in large clusters, and are much hybridized. *C. crenatiflora*, from Chile, is a spotted, yellow species.

**Calchaqui**, is a tribe of South American aborigines.

**Calchas**, the famous soothsayer of the Greeks in the Trojan War, was the son of Thesstor and Mycene.

**Calciferos Formation**, a term used by American geologists for the lowest part of

the Ordovician series. It is a great limestone group, sometimes dolomitic and at other times arenaceous.

**Calcimine**, a composition of whiting or zinc white, glue, water, and sometimes pigments, for finishing plastered ceilings and walls.

**Calcination**, a term used in metallurgy to denote the operation of roasting or burning ores or chemicals.

**Calcite**, one of the commonest and most important of minerals, composing such rocks as marble, limestone, chalk, and oolite, and assuming an extraordinary variety of colors and forms, as stalactites, veins, concretions, petrifications, incrustations, etc. Over a thousand different forms and combinations of calcite crystals are known.

**Calcium**, a metallic element, fifth in abundance in the earth's crust, of which it forms 3.5 per cent. Calcium compounds are essential to life, being found in leaves, and in the bones, teeth, and shells of animals. Calcium is prepared by electrolysis of the fused chloride. It has a yellowish lustre, is tough, and somewhat harder than lead. Specific gravity, 1.54. Following are the most important compounds:

Calcium Carbonate,  $\text{CaCO}_3$ , a white crystalline solid, occurs as Limestone. Specific gravity, 2.7-2.9.

Calcium Chloride,  $\text{Ca Cl}_2$ , a white, deliquescent solid, is a by-product of several commercial processes. Specific gravity, 2.15.

Calcium Hydroxide,  $\text{Ca(OH)}_2$ , a white solid, of which slaked lime is an impure form, is made by allowing calcium oxide, as quicklime, to react with water, thus slaking it. Specific gravity, 2.08.

**Calc-sinter**, or **Calcareous Tufa**, consists of carbonate of lime, and is a deposition from springs, streams, or underground water, from which it is precipitated partly by the escape of carbonic acid which acts as a solvent, and partly by evaporation of the water.

**Calculating Machines** are used for performing arithmetical calculations. In the construction of mathematical and astronomical tables and the tabulation of functions they are the only means of producing perfectly reliable results; and they are also in general use in insurance, financial, and commercial houses. They vary in construction from the simple Slide Rule to complex cash registers and electric tabulators.

The elements of nearly all ordinary calculating machines are cylindrical discs, on the surface, of which are placed the figures 0-9.

2. . . . 9. These discs are so connected that when a number disc is rotated ten places, the number disc of the next order moves one place. This suffices for addition. For subtraction, the discs are rotated in the reverse direction. Multiplication and division, the extraction of the square root, etc., are also performed by these machines.

Probably the most useful modern business machine is a combination of typewriter and calculating machine. It registers columns of dollars and cents corresponding to the keys struck, and by the motion of a lever prints them on paper. The pressure of a special key, combined with the operation of the lever, causes the total to be printed in proper position below the column added. Other machines add, but do not record the items during the process, such as the Comptometer.

Among the more specialized calculators are *Curvometers*, which measure the length of curves on roads or maps; *Planimeters*, which determine by mechanical means the area of any figure; *Integrators*, which evaluate a definite integral; and *Harmonic Analyzers*, which determine the integrals of a curve with remarkable accuracy.

*Cash Registers* are a form of calculating machine which have come into almost universal use in retail establishments. In the National Cash Register Company's 'detail adders,' the mechanism is operated by pressing registering keys, each of which is connected with a corresponding adding wheel inside the register, which shows the total amount of registrations made on that key. In the electric tabulating machine used for recording and summarizing the United States Census returns, a keyboard of 240 characters perforates cards corresponding to the facts to be recorded; the perforated cards are fed into the machine; sorting boxes secure a combination of the facts recorded; and by means of electric connections the record is made. Similar machines have been adopted by many large business houses for cost keeping.

**Calculus, or Stone** (in medicine), a hard concretion formed within the animal body, in consequence of the deposition in the solid form of matters which usually remain in solution. The commonest are Biliary, Urinary, and Salivary Calculi, all of which may block the different ducts, and thus stop the flow of the secretion. For the treatment of Biliary Calculus, see GALL STONES.

**Calculus, Differential and Integral**, also called the **Infinitesimal Calculus**, is the mathematical method which enables us to

deal with quantities which are in process of change or growth—*varying quantities*, as they are called. The height of a child, the distance of a train from the last station passed, the speed of a ball as it passes through the air, the population of a country, are examples of varying quantities. As a consistent method capable of general application, the calculus was first clearly formulated by Newton. Leibniz developed practically the same method a little later, and invented a notation which proved more suitable than Newton's for most purposes. This notation has been long in general use; but within the last fifty years writers on the differential and integral calculus have returned to Newton's method of laying the foundations of the calculus. In some of the higher applications, and especially in dynamical problems, Newton's notation is used with great advantage in association with that of Leibniz. See FUNCTION; VARIATIONS, CALCULUS OF.

Consult Palmer, C. I., and Stout, C. E., *Practical Calculus* (2nd ed. 1952); Kells, L. M., *Elementary Differential Equations* (4th ed. 1954).

**Calcutta**, former capital of British India, chief city and capital of the province of Bengal, is situated on the east bank of the Hugli River (one of the many mouths of the Ganges), about 80 m. from the sea. The city extends for nearly 5 m. along the river, covering an area of about 7 sq.m., and is from 16 to 18 ft. above sea level. It is divided into two sections, the northern or native city and the southern. Fort William, the largest fort in India, garrisoned by European and native soldiers, forms the nucleus of southern Calcutta. It is situated in a fine park known as the *Maidan*.

There are many handsome public buildings in Calcutta—Government House, the former residence of the viceroy of India, being one of the finest palaces in the world. The most important Hindu shrine is that of the goddess Kali, at Kalighat, south of Calcutta.

Among the educational institutions are Calcutta University, an examining institution modelled upon the University of London; the government Presidency College, Sanskrit College, St. Xavier's College, Bishop's College for Christian natives, the government Engineering College, Medical College. Calcutta may be regarded as the great commercial centre of Asia. The river, adjacent to the city, varies in breadth from a quarter of a mile to nearly a mile; and ships of 5,000 tons ascend to Calcutta. The

principal items of export are tea, jute (raw and manufactured), hides, opium, oil seeds, rice, indigo, lac, and wheat. As a great central depot for the richest parts of India, including the Ganges Valley and Assam, the city has also an extensive inland trade. The bulk of the inhabitants are Hindus, but there is a large Mohammedan population and a small percentage of Christians; p. 2,549,790.

Calcutta was founded by Governor Charnock in 1686, by the removal hither of the factories of the East India Company. In 1707 Calcutta had acquired some importance as a town, and was made the seat of a presidency. In 1772 Calcutta superseded Murshidabad as seat of the central government in India, and remained the capital of British India until 1911, when the government was removed to Delhi. Consult Cotton's *Calcutta Old and New*.

**Caldecott, Randolph** (1846-86), English artist, was born in Chester; contributed frequently to *Punch* and *The Graphic*. His picture books for children are inimitable in their subtle humor. *Caldecott's Picture Books* began in 1878 with *John Gilpin* and *The House That Jack Built*. He also illustrated Washington Irving's *Old Christmas* and *Bracebridge Hall*.

**Caldera**, a large basin-like depression of volcanic origin—an extinct crater. A famous example is Crater Lake, Oregon, which is 5 m. in diameter and 4,000 ft. deep.

**Calderon, Philip Hermogenes** (1833-98), Anglo-French painter of Spanish parentage, was born in Poitiers. His works include: *Renunciation of St. Elizabeth of Hungary* (National Gallery, London); *The Proposal*; *The Jailer's Daughter*.

**Calderon de la Barca, Pedro** (1600-81), Spanish poet and dramatist, was born in Madrid. He appears to have served as a soldier in Italy and elsewhere from about 1623 to 1629; and on his return to Madrid, at the latter date, he at once became famous in the theatrical and poetic court of Philip IV. for his comedies and sacred plays. Though more than one story exists of his early turbulence, he decided to become a priest, and was ordained in 1651. Ecclesiastical performances were heaped upon him, and he became one of Philip's chaplains in 1663, dying as superior of the Congregation of San Pedro in 1681.

His most famous secular dramas are *El Mágico Prodigioso*, *La Vida es Sueño*, and *El Alcalde de Zalamea*. The Calderon literature is very large, especially in Germany, where

Calderon is placed by some authorities above Shakespeare. Consult Gassner, John, *Masters of the Drama* (3rd ed. 1954).

**Calderwood, David** (1575-1650), Scottish ecclesiastic and historian, was born at Dalkeith, Midlothian. He opposed the introduction of prelacy and in 1617 was deprived of his charge, imprisoned, and banished. He went to Holland, where, in 1621, he published *The Altar of Damascus*, a defence of Presbyterianism. After his return to Scotland in 1625, he assisted in drawing up the *Directory for Public Worship*, and wrote his celebrated *Hist. of the Kirk of Scotland* (1678).

**Caldicott, Alfred James** (1842-97), English musician, was born at Worcester; composed the glee *Humpty Dumpty*, *Winter Days* and the oratorio *The Widow of Nain*.

**Caldwell, Erskine** (1903- ), Am. novelist, native of Georgia. Works: *God's Little Acre*, *Tobacco Road*, short stories on poverty-stricken tenant farmers of the South; *Southern Laughter*, 1943; *Tragic Ground*, 1944. Autobiog.: *Call It Experience*, 1951.

**Caleb**, the son of Jephunneh, was one of the spies sent by Moses to explore the land of Canaan.

**Caledonia**. See *Scotland*.

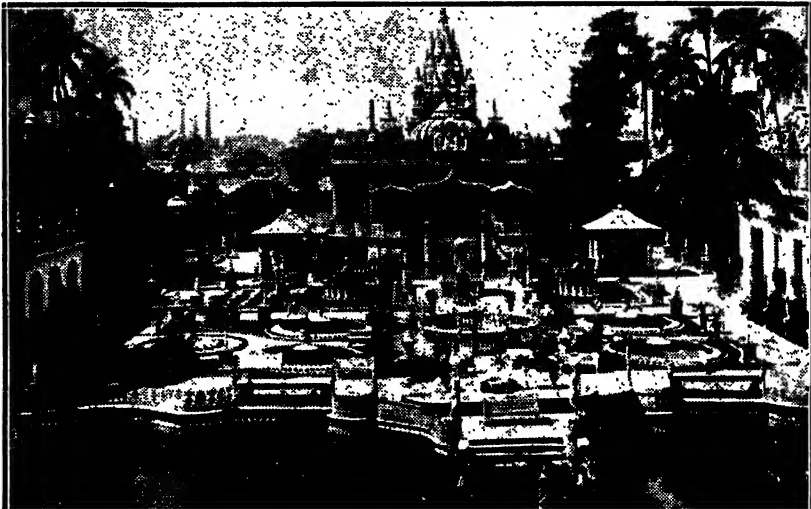
**Caledonian Canal**, waterway, partly natural, partly artificial, through the picturesque Glenmore, Inverness-shire, Scotland, connecting the Atlantic Ocean with the Moray Firth branch of the North Sea.

**Calendar**, the mode of adjusting the natural divisions of time with respect to each other for the purposes of an almanac or a table of months, days and seasons. The earliest standard interval was the day, distinguished by the alternation of light and darkness, and determined by the rotation of the earth on its axis. For longer periods, the lunar month was next marked out, an interval of about 29½ days; and finally, the succession of the seasons suggested the year. The nations of antiquity determined the duration of the year in various ways; by observing the regular recurrence of the annual seasons, by noting the regular periodic appearance of certain stars, by checking the position of the sun in relation to the earth and the planets, and so on.

On the introduction of Christianity, some method of fixing the date of Easter, on which that of many other festivals of the church depended, became necessary. Much difference of opinion prevailed. At length, in A.D. 325, it was decided, at the Council of Nicæa, that

Easter should be held on the first Sunday after the fourteenth day of the moon that occurred next after the vernal equinox, and that if the fourteenth day of the moon fell on the day of the equinox, the following Sunday should be Easter day. It was also declared that, in finding Easter, the vernal equinox should be considered to fall every year on March 21. Now the length of a lunation is very variable, and cannot be used in combination with the length of a solar year. It was therefore necessary to adopt a fictitious or

Nations with a view to preparation of international legislation. Some advocate a revised calendar year which would have equal quarters in which the first month of each would have 31 days and the other two 30 days each. Each quarter would comprise 13 weeks, or 91 days of which 13 would be Sundays and 78 weekdays, each month to have 26 weekdays. The 365th day of the present calendar would become an extra Saturday; to maintain the balance in leap-year, an extra Saturday would be introduced between June 30 and July 1.



*Scene in Calcutta.*

calendar moon, of which a certain number of lunations would be equal in length to some number of solar years. Thus cycles were formed in which the dates of Easter recurred in the same order. Many methods of determining Easter were used.

The Calendar observed in the United States is known as the Gregorian Calendar and grows out of a bull published by Pope Gregory XIII in 1582. It provides for a common year of 365 days with a leap year of 366 days every fourth year, with further provision that years numbered in even hundreds shall not be leap years unless the number be divisible by 400. The Gregorian Calendar was accepted generally by Catholic nations before the close of the 16th century. Great Britain and its possessions adopted it in 1752.

Reform of the calendar to provide balance in structure and perpetuity in form has been discussed by a committee of the League of

This version of calendar reform, on a twelve-month basis, received the support of many church organizations which favored the stabilization of Easter.

Another proposal which received generous financial support in the United States from George Eastman, camera manufacturer, was for a thirteen-month calendar in which every month would begin on Sunday, each month would have twenty-eight days, Monday always would be the 2d, 9th, 16th or 23d day of the month, and the thirteenth month to be called *Sol*, would be inserted between June and July. There would be one extra 'blank' day in each year on the day before New Year's Day, and in leap year two extra days. See also DAY; EASTER; MONTH; SEASONS; WEEK; YEAR.

Consult Wilson, P. W., *Romance of the Calendar* (1937); Achelis, Elisabeth, *The World Calendar* (1937) and *The Calendar for*

*Everybody* (1943); Archer, Peter, *The Christian Calendar and the Gregorian Reform* (1941).

**Calendering**, the process of finishing by pressure the surface of linen, other textile fabrics, and paper.

**Calends**, the first day of each Roman month, which was divided into *calends*, *nones*, and *ides*. The calends always fell upon the first of the month; in March, May, July, and October, the nones on the 7th, and the ides on the 15th; and in the remaining months, the nones on the 5th, and the ides on the 13th.

**Calendula**. See *Marigold*.

**Calepino**, or **Da Calepio**, **Ambrogio** (1435-1511), Italian lexicographer, and an Augustinian monk, was a native of Bergamo; devoted his life to the compilation of a polyglot dictionary, first published at Reggio in 1502.

**Calgary**, city, Alberta, Canada, the largest and most important city between Winnipeg and Vancouver; is situated in the heart of one of the richest agricultural and stock raising regions of Canada. There are also valuable deposits of iron, lead, coal, oil, silicate, sandstone, and clay in the neighborhood. Manufactures include the large repair shops of the Canadian Pacific, lumber mills, iron and metal works, brick and cement works, meat packing establishments, soap works, and flour mills; p. 139,105.

**Calhoun, John Caldwell** (1782-1850), American statesman, was born, of Scotch-Irish descent, in Abbeville District, S. C., on March 18, 1782. From 1817 to 1825 Calhoun was Secretary of War in the cabinet of President Monroe, and as such, showed conspicuous administrative talent. He was vice-president from 1825 to 1832, during the administration of John Quincy Adams and the first administration of Andrew Jackson. He incurred Jackson's strong personal displeasure, owing to his earlier denunciation of Jackson's high-handed course in the Seminole War (see JACKSON, ANDREW), and also to his opposition to Jackson's championship of Mrs. Eaton (see EATON, MARGARET), while the political views of the two men gradually came to differ irreconcilably.

It was during Jackson's first administration that Calhoun's views underwent a marked change. The immediate occasion of the change was the policy of the government which led to the nullification movement of 1832-3 in South Carolina; and it was he who, in the draft of the famous South Carolina Exposi-

tion of 1828, and particularly in his *Address to the People of South Carolina*, 1831, provided his State and the South with probably the ablest exposition ever prepared, an exposition which has become classic, of the theory of nullification and of state sovereignty generally. To support these views and to fight for the cause of his state, he resigned the vice-presidency, Dec., 1832, and entered the U. S. Senate, in which he served, except in 1844-5, until his death. He defended slavery as a positive good and bitterly assailed the Abolitionists and their propaganda; he fought protectionism and as Tyler's Secretary of State, 1844-5, did more than any other man to secure the annexation of Texas; he opposed the Mexican War; fought the Wilmot Proviso, and attacked the doctrine of squatter sovereignty; and, finally, though weakened by illness, opposed the compromise of 1850.

Consult Wiltse, C. M., *John C. Calhoun, Nationalist, 1782-1828* (1944) and *John C. Calhoun: Nullifier, 1829-1839* (1949); Coit, M. L., *John C. Calhoun; American Portrait* (1950).

**Calhoun, William James** (1848-1916), American diplomat, was born in Pittsburgh, Pa. From 1898 to 1900 he was a member of the Interstate Commerce Commission; in 1905, special commissioner for the United States to Venezuela, and in 1909-13 minister to China.

**Calibre**, the technical term for the diameter of the bore of a firearm. See GUNS.

**Calico Bass**, or **Grass Bass**, a small, mottled, sunfish-like bass, closely related to the Crappie. Found in the Great Lakes and Mississippi valley.

**Calico Printing**, the art of imprinting colored patterns on cotton cloth. The design may be cut out on a block or blocks of wood, but is more commonly reproduced on copper rollers. The printing machine itself consists of a large central drum, around the circumference of which the engraved copper cylinders are arranged, one for each color to be printed. An equal number of cloth-covered wooden rollers carry the color from the color boxes to the cylinders. As the central drum revolves, the fabric to be printed is pressed between it and the cylinders, each of which leaves its impress. In the earliest machines but one color was printed at a time, but machines are now made to print as many as 16 in a single operation.

See Thorpe's *Outlines of Industrial Chemistry* (1920); Little, Frances, *Early American Textiles* (1931); Johnson, W. H., and New-



Kirk, L. V., *The Textile Arts* (1944); Pettit, F. H., *Block Printing on Fabrics* (1952).

**Calicut**, seaport, of Malabar, Madras presidency, India. Calicut was the first place in India visited by Europeans. Covilhão, the Portuguese adventurer, landed here about 1486. In 1792 the port came into the possession of the British; p.82,234.

**Calif (Caliph)**, the title assumed and borne by the consecutive rulers of Islam, as 'successors' of their great prophet, Mohammed. Consult Redhouse's *Vindication of the Ottoman Sultan's Title of Caliph*; T. W. Arnold, *The Caliphate* (1924); Pears *Turkey and Its People*.

**California** (popularly called the 'Golden State'), a Pacific State of the United States, the second largest state in the Union; p. 10,586,223. There are 58 counties. The State has two extensive mountain systems—the Sierra Nevada in the eastern part, and the Coast Range in the western part. The Sierra Nevada averages about 50 m. in width, and in Mount Whitney (14,501 ft.) has the loftiest peak in the United States, exclusive of Alaska. Noteworthy features of the Sierras are the many deep gorges, prominent among them being the Yosemite Valley (q.v.).

The Coast Range begins with the San Jacinto Range in the south, and includes the Santa Ana, San Bernardino, San Gabriel, Sierra Madre, San Rafael, Coast (a local name), and Monte Diablo ranges. The highest peaks of the Coast Range are in Southern California, and include San Bernardino (10,630 ft.), San Jacinto (10,805 ft.), and Tehachapi (9,214 ft.). To the east of the San Bernardino Range is a depressed and arid region comprising Death Valley and the Mohave and Colorado Deserts.

The Great Valley between the Sierra Nevada and the Coast Range is about 450 m. long and 40 m. wide, and is remarkable for its fertility. Its northern basin is drained by the Sacramento River flowing southward, and its southern basin by the San Joaquin River flowing northward.

The vast extent of the State, together with the wide variation of its physical features, has given California a greatly diversified climate. In the mountainous regions of the north the winters are severe, and in the northern sections west of the Coast Range fogs often prevail. In the southern part of the State the winters are extremely mild, except upon the mountain ranges; this section contains many popular winter resorts, such

as Santa Barbara, San Diego, Los Angeles, and Monterey.

California is richly endowed in natural wealth. The total value of its mineral products for gold, silver, copper, lead and zinc, as estimated by the United States Bureau of Mines, division of the Department of Commerce, for 1938 was \$94,651,250. The production of crude petroleum in California in 1937 was 238,521,000 barrels. It is estimated that the natural gas of the Kettleman Hills concern would suffice to fill the needs of the State for half a century.

There are twenty National Forests in the State. The largest of these are the Sequoia, 1,329,616 acres; Inyo, 1,521,353 acres; Klamath, 1,524,873 acres; and Modoc, 1,494,407 acres. The total acreage of California's forests is 19,026,819. The principal trees are the redwood, western yellow pine, sugar pine, Douglas fir, white and red fir, and incense cedar.

The coastal and riparian waters of California abound in fish of many types. The principal products are pilchards, albacore and tuna, salmon, bonito, or skipjack, flounders, rockfishes, barracuda, shad, sharks, skate, rays, shrimps, squid, spiny lobster, oysters and cockles.

California has an immense area of fertile soil; and though for a time mining offered greater attractions than agriculture, the latter industry has rapidly developed until it has become pre-eminent. The great central valley, formerly a pasture for sheep, then a vast grain field, is now the site of farms, orchards and vineyards. In variety of agricultural products the State is unsurpassed, situated as it is in both the temperate and subtropical zones. There are about 28 million acres under cultivation, of which about 4,230,000 acres are under irrigation. The principal products are: corn, winter wheat, barley, oats, grapes, figs, lemons, oranges, grapefruit, apples, peaches, cherries, almonds, walnuts, and cotton.

The poultry industry flourishes under the most favorable climatic conditions, and is carried on scientifically in several sections. More than a million dollars' worth of honey is produced annually. The dairy industry has risen to an output of about \$60,000,000.

The leading industrial centres are San Francisco, Los Angeles, and Oakland. Nor must the gigantic motion picture industry be omitted from a survey of California's activities and products. The world's headquarters providing that popular form of entertainment

status with armies of employees and here are generally found the majority of the best known actors and actresses of the film world.

California can boast of a tremendous shipping trade. Most recent statistics show that 5,369 vessels of 17,211,000 total tonnage registry entered the port of Los Angeles and 17,353 vessels of 14,974,000 total tonnage registry entered the port of San Francisco within the year. Much shipping plys on the Sacramento River.

California has about 13,000 miles of steam railroads, also a magnificent system of hard surfaced roads. In 1937 California expended \$49,762,000 on highways and the only states to exceed this figure were New York, Pennsylvania and Illinois. Motor vehicles registered in California, 1939, were 2,642,006, exceeded only by New York.

California, owing to its geographical position, controls a great part of the trade between the United States and Asiatic countries; and the increasing prosperity of Alaska, with which the State is connected by steamship lines, has materially advanced its commercial importance. (See *ante*, SHIPPING.)

**Education.**—California operates one of the most efficient educational systems in the United States. Compulsory education was introduced in 1874; it is free for all over the age of four and compulsory for all between eight and sixteen years. Physical training is obligatory. There are State teachers' colleges at San Francisco, San Jose, Santa Barbara, San Diego, Fresno, Arcata and Chico. State-aided institutions of the higher learning include the University of California at Berkeley, the teachers' colleges, the junior college departments of high schools, and the district junior colleges. The University of California is rated on a par with Harvard and Columbia, and is considered one of the foremost universities of the United States. Its enrollment in 1940 was 34,355, surpassing that of any previous year. The State for 1937-39 contributed about \$15,000,000 to the university and about \$72,000,000 to the public school system.

Other famous institutions are the Leland Stanford University (q.v.); the University of Southern California at Los Angeles; a State polytechnic school at San Luis Obispo and the College of the Pacific at Stockton. There is also a new astrophysical observatory under the control of the California Institute

at Washington. An important feature of the new observatory is a reflecting telescope with a mirror 200 inches in diameter.

**Charities and Corrections.**—The State penal and charitable institutions are in charge of a State Board of Charities and Corrections, consisting of six members, appointed by the governor for a term of four years. These institutions include State prisons at San Quentin and Represa; the Preston School of Industry, at Waterman; the Whittier State School, at Whittier; hospitals for the insane at Agnew, Stockton, Napa, Talmage, Norwalk, and Patton; the Sonoma State Home, at Elbridge, and Pacific Colony, at Spadra—homes for the feeble-minded; the Industrial Home for Adult Blind, at Oakland; California School for Girls, at Ventura; and the State Industrial Farm for Women, at Sonoma.

**Government.**—The California constitution was adopted in 1879.

**History.**—The name California was first used in a book by Garcia Ordoñez de Montalvo (*Las Sergas de Esplandian*), published in Spain in 1510. It was applied by Cortes to his colony at La Paz (Lower California) in 1537. The entire situation was changed when, in 1822, Mexico became independent of Spain. California passed under Mexican control. At first the relations between California and Mexico were pleasant; but about 1830 a spirit of unrest and dissatisfaction began to pervade the province. In 1845 a considerable American immigration started, and American settlements sprang up throughout the province, notably in the Sacramento Valley. In June, 1846, an American surveying party inaugurated the 'Bear Flag Revolt,' captured the town of Sonoma, and on July 4 issued a proclamation declaring California independent. This movement was in opposition to the policy of the United States toward California, and was officially discredited; but on July 7, acting under instructions from the U. S. Government, then engaged in war with Mexico, Commodore Sloat took possession of Monterey and San Francisco (known as Yerbe Buena). Further operations on the part of the United States soon brought about the complete occupation of California, and on Sept. 9, 1850, it came into the Union as a free and sovereign State, with its own constitution, governor, and legislature.

Two years earlier, Jan. 24, 1848, gold was

discovered at Sutter's Mill, Coloma, and immigrants to the number of many thousands flocked to California from all parts of the world. A very large proportion of these immigrants were lawless and irresponsible, and the conditions in the State, until the better element by drastic measures succeeded in establishing law and order, were such that life and property were in continual jeopardy. (See FORTY-NINERS.) On April 18, 1906, the State was visited by the worst earthquake in its history, extending over about 190 miles. In 1914 and in 1916 heavy floods in the southern part of the State caused serious property loss. California has two of the world's greatest bridges, the San Francisco-Oakland Bay Bridge, completed 1936, and the Golden Gate Bridge, completed 1937. 1939 saw the Golden Gate International Exposition, at San Francisco.

**Bibliography.**—Consult Bancroft's *History of the Pacific States of North America*; Norton's *The Story of California from the Earliest Days to the Present Time* (1913); Eldredge (ed.), *History of California* (5 vols. 1915); *A Chronicle of the California Trail and El Dorado* (Chronicles of America, 1918); Foster, *Gold Regions of California* (1884); Goodwin, *The Establishment of State Government in California, 1846-1850* (1914); Clark's *Golden Tapestry of California* (1937).

**California**, city, Missouri, county seat of Moniteau County; p. 2,627.

**California**, borough, Pennsylvania, in Washington County; p. 2,831.

**California, Gulf of** (called also PURPLE SEA—*Mar Bermejo*—and SEA OF CORTES), an arm of the Pacific, 700 m. long and 60 to 150 m. broad, which separates the peninsula of Lower California from Mexico.

**California, Lower**, territory of Mexico, occupying the peninsula of that name, which runs southeast from California, United States. Its width, which varies greatly, averages 75 m., its length is about 800 m., and its area is 58,328 sq. m. Four-fifths of the area is covered with mountains, largely of granite formation, running north and south, and rising from 3,250 ft. to 10,075 ft. in the San Pedro Martir Range. Gold, silver, copper, iron, sulphur, manganese, gypsum, coal, onyx, and salt are found, and there are indications of the presence of petroleum and of precious stones. Fossil remains are abundant in some localities. Pearl and shark fisheries are important—about \$300,000 worth of pearls being shipped annually to the United Kingdom. Foreign trade is carried on through

the ports of La Paz, Magdalena Bay, Santa Rosalia, and Ensenado.

Lower California was discovered by Cortez in 1533, and settled by the Jesuits in 1642.

**California, University of**, a coeducational institution of higher learning in Berkeley, Cal. It was organized in 1868; opened at Oakland in 1869; and transferred to its present site in 1873.

As at present organized, the University comprises the following departments: in Berkeley—Colleges of Letters, Social Sciences, Natural Sciences, Commerce, Agriculture, Mechanics, Mining, Civil Engineering, Chemistry, Medicine (first year); Schools of Architecture, Education, Jurisprudence and Librarianship, University Extension Division and Institute of Child Welfare; at Mount Hamilton—Lick Observatory; in San Francisco—California School of Fine Arts, George Williams Hooper Foundation for Medical Research, Hastings College of Law, College of Medicine (2d, 3d, 4th and 5th years), College of Dentistry, and California College of Pharmacy; in Los Angeles—College of Medicine (Los Angeles Department, graduate instruction only) and University of California at Los Angeles, including College of Letters and Science and Teachers College; in Riverside—Citrus Experiment Station and Graduate School of Tropical Agriculture; in Whittier—Southern California Pathological Laboratory; in the Imperial Valley—outlying agricultural station; in La Jolla—Scripps Institution for Biological Research; in Pacific Grove—Herzstein Seaside laboratory; in Santa Monica and Chico—forestry stations; and in Davis—University Farm School. Annual summer sessions are conducted.

**Caligula**, (12-41 A.D.), Roman emperor, was the son of Germanicus and Agrippina. On his father's death he ingratiated himself with Tiberius and on the death of the latter in 37 A.D. (which he is believed to have hastened), he was declared heir to the throne. For the first few months he acted with justice and moderation; but after a severe illness he appeared as the most sanguinary tyrant known to history and unquestionably he was insane. At last, in January, 41 A.D., Cassius Chærea, tribune of a praetorian cohort, formed a conspiracy, and murdered him.

**Calipers**, a kind of compass with curved legs, used in machine shops for measurements, such as the determination of diameters of shafts, bores, and centring.

**Caliph**. See **Calif**.

**Calippus**, or **Callippus** (c. 330 B.C.), Greek

astronomer, who invented the Calippic lunar cycle. See CALENDAR.

**Calisaya.** See Cinchona.

**Calisthenics.** See Gymnastics.

**Calixtus, (Callixtus) I.**, bishop of Rome and saint, elected 219, and martyred Oct. 14, 222; is known as the constructor of the celebrated catacombs on the Appian Way.

**Calixtus, II.** (d. 1124), Pope of Rome, was elected 1119, previous to which he was archbishop of Vienne, in France.

**Calixtus, III.**, the name of two Popes. The first was one of the anti-Popes elected in 1168, under the influence of Frederick Barbarossa, in opposition to Alexander III. The second was Alfonso de Borgia, a Spaniard, elected in 1455. He annulled the sentence against Joan of Arc, and appealed to Christendom against the Turkish invasion in 1456.

**Calixtus (Callisen), Georgius** (1586-1656), German Lutheran theologian, was born in Medelbye, Schleswig. His chief work is *Epitome Theologiæ Moralis* (1634).

**Caliking.** See Caulking.

**Call**, in finance 'Call money' means money deposited with a bank, or loaned by a bank, and returnable when called for.

**Calla**, a genus of plants of the family Araceæ.

**Callahan, James Morton** (1864- ), American educator, was born in Bedford, Ind. From 1916 to 1929 he was Dean of the College of Arts and Sciences at West Virginia University. His published works include *Confederate Diplomacy* (1901); *American Expansion Policy* (1908); *Alaska Purchase* (1908); *Evolution of Seward's Mexican Policy* (1909); and *History of West Virginia* (1923).

**Callao**, chief port of Peru, in Callao province, at the mouth of the Rimac River. Industries include the manufacture of sugar, flour, cocaine, liquors, matches, cigarettes, and machinery. It has a good harbor, protected by San Lorenzo Island, and equipped with docks and sea walls. The chief exports are copper, silver, hides, guano, salt, coffee, sugar, and wool; p. 120,000.

**Callcott, Sir Augustus Wall** (1779-1844), English artist. In 1837 he exhibited *Raffaele and the Fornarina*, and was knighted; and in 1844 he was appointed conservator of the Queen's pictures.

**Calles, Plutarco Elias** (1877-1945), formerly Mexican President. He was born in Guaymas, in the State of Sonora. He is interested in educational and social reforms, and the agrarian rights of the peons.

**Callias**, a name borne by various members of a noble Athenian family famous for their wealth.

**Callichthys**, a genus of cat-fish or silurids, including about a dozen species found in the rivers of tropical America.

**Callimachus**, (c. 310-240 B.C.), scholar and poet, was born in Cyrene, and lived in Alexandria, where he was in charge of the famous library from about 260 to 240 B.C. He wrote about eight hundred works, of which only half a dozen hymns, some sixty epigrams, and some fragments of elegies are extant.

**Callinus**, the earliest extant writer of elegiac poetry in Greece; lived in the 6th or 7th century B.C.

**Calliope**, mother of Orpheus, the first of the Nine Muses. She presided over epic poetry, and is generally represented with a wax tablet and a pencil.

**Callirrhoe**, a famous ancient fountain in Athens, one of the chief sources of the water supply of that city.

**Callisthenes**, Greek historian and philosopher, was born in Olynthus.

**Callisto**, an Arcadian nymph, companion of Artemis.

**Callistratus**, a prominent Athenian public man and orator, between 380 and 360 B.C.

**Callorhynchus**, a fish genus nearly allied to *Chimæra* (q.v.).

**Callosities**, bare patches of skin in which the epidermis is hardened and thickened; are of frequent occurrence in mammals.

**Callot, Jacques** (1592-1635), French draughtsman and etcher, was born in Nancy, Lorraine.

**Calluna**, a genus of the order Ericaceæ.

**Calmar.** See Kalmar.

**Calmet, Augustine** (1672-1757), French theologian and historian, born near Commercy. Entering the Benedictine order, he was successively professor of theology in the abbey of Moyen-Moutier (1696), prior of several monasteries, and in 1728 became abbot of Senones in Lorraine. See *Life*, by Dom E. Fangé (1763).

**Calochortus**. A liliaceous genus of plants found chiefly in the Far West, and especially in California, in all sorts of situations and soils.

**Calomarde, Don Francesco Tadeo** (1775-1842), Spanish statesman, born at Vilhel, Aragon. A zealous absolutist, Calomarde acted as minister of justice (1824-33), framing new penal codes, recalling the Jesuits, closing the universities, and persecuting the Liberals by tyrannical statutes.

**Calomel**, mercurous chloride, or subchloride of mercury, is found native as 'horn quicksilver,' but is generally manufactured by triturating a mixture of mercuric sulphate, common salt, and metallic mercury, subliming, and washing with boiling water.

**Calonne, Charles Alexandre de** (1734-1802), French Minister of Finance under Louis XVI.

**Calophyllum**, a genus of beautiful evergreen, leathery-leaved tropical trees, order *Guttiferae*.

**Caloric Engine, or Hot Air Engine.** See **Air Engines**.

**Calorie** is a unit of quantity of heat. It is usually stated as the amount of heat required to raise 1 gram of water 1° C.; but as this varies slightly with the initial temperature, it is necessary to specify that the rise is from some given point, such as from 15.5°

to 16.5° C., or that it is  $\frac{1}{100}$  of the quantity of heat required to raise 1 gram of water from 0° to 100° C.

**Calorimeter** is the name given to the apparatus used to determine the specific heat of substances, or the amounts of heat evolved or absorbed in various physical and chemical changes. See **SPECIFIC HEAT, LATENT HEAT, and THERMO-CHEMISTRY**.

**Calotte**, a cap or coif commonly worn over the tonsure by ecclesiastics in France in the 15th and 16th centuries. The word, when used in architecture, designates a flattened dome.

**Calottists**, a satirical society founded in 1702 by Aymon and Torsac, of Louis XIV.'s bodyguard, and deriving its name from the *calotte*, a small cap worn by priests to conceal their tonsure.

**Calovius, or Kalau, Abraham** (1612-86), leader of the strict Lutheran party in Prussia, born at Mohrunge, E. Prussia. His chief works were *Systema Locorum Theologorum*; *Historia Syncretistica* (1682).

**Caloyers**, Greek monks of the order of St. Basil.

**Calpe**, the mountainous headland in the S. of Spain, now known as Gibraltar.

**Calpurnia**. The last wife of Julius Cæsar, who married her in 59 B.C.

**Calpurnius Siculus**, a Roman poet of the 1st century A.D.

**Caltagirone**, tn. and episc. see, prov. Catania, Sicily; p. 30,845.

**Caltanissetta**. (1.) Province of Italy, in the middle of Sicily; p. 327,977. (2) Capi-

tal and episc. see of above province; p. 56,905.

**Caltha**, a genus of plants belonging to the order of Ranunculaceæ.

**Caltrop** (*A. S. calcatrippe*), a small iron ball with projecting spikes; was much used in mediæval warfare, the ground over which an enemy was expected to charge being thickly strewn with them, with the effect that the advancing horses were at once disabled by the sharp spikes piercing their hoofs. Caltrops were also used by the New England colonists, who placed them in the grass around their villages, as a precaution against Indian attacks. The word is, moreover, applied to plants that catch or entangle the feet.

**Caluire et Cuire**, tn., dep. Rhône, France, on river Saône; p. 10,926.

**Calumba**. *Calumbæ radix* is the dried root of *Jateorrhiza palmata*, a lofty herbaceous climbing plant, native of E. Africa.

**Calumet**. See **Laurium**.

**Calumet**, the tobacco-pipe specially known among the Algonquin Indians as 'the pipe of peace,' owing to its distinctive use at a council of warriors assembled for the purpose of concluding peace between their opposing tribes.

**Calumpit**, pueb., Bulacan prov., Luzon, Philippine Is.; p. 13,897.

**Calvados**, dep. of Normandy, France; p. 400,026.

**Calvaert, or Caluwaert, Denis**, also designated **DIONISIO FIAMMINGO** (1540-1610), Flemish painter of the Bologna school, born at Antwerp. Among the larger pictures by Calvaert the best are: *The Martyrdom of St. Agnes*, in the church of St. Agnes at Mantua; *Paradise*, at Bologna.

**Calvary**, the scene of the crucifixion of Jesus Christ, is situated close to Jerusalem. See **JERUSALEM**.

**Calvé, Emma** (1864-1942), French operatic singer, whose real name was **EMMA DE ROQUER**, was born at Madrid.

**Calverley, Charles Stuart** (1831-84), English poet, born at Martley, Worcestershire.

**Calvert**, tn., Robertson co., Tex.; p. 2,548.

**Calvin, John** (1509-64), the reformer, was born at Noyon in Picardy. Calvin's views may be summarized thus: (1) particular election; (2) particular redemption; (3) moral inability in a fallen state; (4) irresistible grace; (5) final perseverance. As a theological writer, Calvin is remarkable for clearness, method, and scientific exactitude:

as a reasoner he is distinguished for logical astuteness. A complete edition of Calvin's *Works* was issued in 59 vols. by Braun, Reuss, and Cunitz in 1863-1900. See Paul Henry's *Life and Times of Calvin* (1835); Beza's *Histoire de la Vie et la Mort de Calvin* (1564); and other *Lives* by Bolsec (1616), Masson (1638).

**Calvinia**, dist. and vil. in the n.w. province, Cape Colony; p. of dist. 12,255.

**Calvinistic Methodist Church**. See **Methodism**.

**Calvi Risorta**, vil., prov. Caserta, Italy, see of a bishop; p. 3,308.

**Calvo, Carlos** (1824-1906), Argentine historian, born at Buenos Ayres. His chief works include *Annales Historiques de la Révolution de l'Amérique Latine* (5 vols. 1864-75); *Dictionnaire du Droit International* (1885).

**Calycanthus**, a genus of hardy deciduous shrubs mostly natives of North America.

**Calydon**, a mythical city of Ætolia, the scene of the hunt of the Calydonian Boar, related by Ovid in bk. viii. of *Metamorphoses*.

**Calymene**, a genus of fossil trilobites which is very common in Silurian rocks of Europe and N. America.

**Calypso**, a daughter of Atlas, who lived in the island of Ogygia.

**Calyx**, the outer of the four whorls which compose a typical flower, its parts or leaves being known as sepals. When the sepals are joined together, forming a cup, the calyx is gamosepalous; when the sepals are not united, it is called polysepalous.

**Cam**, a mechanical device by which the rotary movement of a shaft may be transformed into any required movement of other parts of the machine which engage with the cam.

**Cam**, riv., Cambridgeshire, England, formerly called the granta, flows in a n.w. and then n.e. direction. Its total length is 40 m., and it is navigable as far as Cambridge.

**Cam**, or **Cão, Diogo**, Portuguese navigator, sent by Alfonso v. of Portugal to continue the explorations of the African coast promoted by Prince Henry; in 1484 discovered the Congo.

**Camaguey**, a popular name for Puerto Principe prov., Cuba, sometimes extended to the city.

**Camajore** (anc. *Campus Major*), tn., Tuscany, Italy; p. 18,548.

**Camajuani**, city, Santa Clara prov., Cuba, p. 5,082.

**Camaldolites**, or **Camaldulensians**, an

austere order of monks founded in 1012 by St. Romuald at Camaldoli, among the Etruscan Apennines, about 30 m. east of Florence.

**Camalig**, pueb., Albay prov., Luzon, Philippine Is.; p. 14,153.

**Camana**, seapt., Peru, cap of the prov. and on the riv. of the same name; p. 6,000.

**Camargo**, tn., Tamaulipas state, Mex., on the San Juan, near its confluence with the Rio Grande; p. 6,815.

**Camargue, La**, isl., France, in the Rhone delta.

**Camarilla**, originally the small or audience chamber of a king, but the term has come to mean a royal clique, junto, or cabal of unofficial court intriguers.

**Camarina**, tn., on the s. coast of Sicily, founded as a colony from Syracuse in 599 B.C. It was successively destroyed by the Syracusans (552 B.C.), Carthaginians (405 B.C.), Romans (258 B.C.), and Saracens (853 A.D.).

**Camarines, Ambos**, prov., Luzon, Philippine Is., in middle of s.e. peninsula. Nueva Caceres is the capital; p., civilized, 233,472; wild, 5,933.

**Camass or Quamash**. An important food of the Indians of the Northwestern United States. It consists of the bulbs of various species of *Quamasia*, a liliaceous genus, frequently found in vast colonies in damp places in the West.

**Cambacères, Jean Jacques Régis de** (1753-1824), French statesman, was born at Montpelier. The French *Code Civile* was prepared under his direction.

**Cambaluc**, (*Khan-Bcligh*, 'city of the emperor'), the name by which, during the Middle Ages, Pekin became known to Europe, and rendered familiar by Marco Polo's travels.

**Cambay**, port and capital of a small Indian feudatory state of the same name, Bombay Presidency, India; p. 28,098.

**Cambay, Gulf of**, a large inlet about 80 m. long and 25 broad, between the peninsula of Kathiawar and the mainland of Bombay.

**Camberwell**, parliamentary borough, Southeastern London; p. 261,357.

**Camberwell Beauty**, a butterfly. See **MOURNING CLOAK**.

**Cambist**, a person skilled in the foreign exchanges, hence a dealer in bills of exchange.

**Cambium**. See **Bark**.

**Cambodia**, kingdom and French protectorate of Indo-China, bordering on the east-

ern coast of the Gulf of Siam, situated between Siam on the n. and n.w. and Cochinchina and Annam on the s. and e.

Owing to the periodical inundations, the soil of the plains is remarkably fertile. Sweet potatoes and tropical fruits, from the coconut and bread-tree to the guava and banana, flourish luxuriantly. Rice, cotton, sugarcane, coffee, cinnamon, betel, tobacco, indigo, sugar-palm, mulberry, and other industrial plants prosper. The forests—very extensive and little depleted—are rich in building, joinery, cabinet, and dye woods. Caoutchouc and cardamoms especially abound. The elephant, tiger, panther, rhinoceros, buffalo, wild boar, monkey, and honey bear are included in the fauna. Crocodiles and numerous poisonous reptiles also abound. The rivers teem with fish, and many towns are devoted exclusively to drying and salting fish and manufacturing fish oil.

Agriculture and fishing are the principal occupations, but there are some manufacturing interests. Sugar is made from the fan palm all over the country, and silk weaving is carried on as a domestic industry. Trade is chiefly in the hands of foreigners and is carried on through Saigon, in French Indo-China.

The total population is estimated at 3,748,000, four-fifths of whom are collected in the valley of the Mekong. About three-fourths of the population belong to the Camboja or Khmer race. Chinese and Annamites, each about 11 per cent., are steadily increasing through immigration.

The Cambodians approach the Malay and Indian types; are tall and robust, copper-colored rather than yellow, the skull elongate, the nose, though flat, more prominent than in the Annamite, and the eyes very slightly oblique. The religion is a development of Buddhism, in which the worship of ancestors forms a large part. Christianity has made little progress.

The Cambodian language has much in common with the other monosyllabic languages of Indo-China, especially those of Siam and Annam.

In 1941 Cambodia was delivered into Japanese military control by Vichy France, and part of it was ceded to Thailand.

A most remarkable feature of Cambodia is the splendid ruins of Khmer architecture. The great piles explored number over fifty, while the smaller isolated structures are counted by the hundreds. Among the ruins are also massive stone bridges so solidly con-

structed as to have almost all resisted the periodical inundations and shock of huge tree-trunks hurled against them. See *ΑΝΘΡΩΠΟΝ*.

*Bibliography.*—Consult Vincent's *The Land of the White Elephant*; and Hannah's *Brief History of Eastern Asia*.

**Cambodia River.** See *Mekong*.

**Cambon, Jules Martin** (1845-1935), French diplomat, born in Paris. From 1897 to 1902 he was French ambassador at Washington, and during that period acted as intermediary between Spain and the United States at the close of the Spanish-American War. He was ambassador to Spain in 1902, and to Germany from 1907 to 1913. During World War I, he served as General Secretary to the Foreign Office, as adviser to the Foreign Office on Franco-American relations and on matters concerning Alsace-Lorraine, and as one of the French delegates at the Peace Conference. He was elected a member of the French Academy in 1918.

**Cambon, Pierre Paul** (1843-1924), French administrator and diplomatist, brother to Jules Cambon (q.v.), was born in Paris; was appointed ambassador to Great Britain in 1919.

**Camborne**, parliamentary and market town, West Cornwall, England; p. 14,157.

**Cambrai**, town, Northern France, department of Nord, on the River Scheldt, 32 m. s. of Lille. It is famous for its fine linen textiles, or cambrics, invented and first manufactured here by Baptiste Coutaing in the 15th century; p. 26,023.

*Camuracum*, the ancient Cambrai, was one of the chief cities of the Nervii. It was fortified by Charlemagne, and was long governed by its own bishops, to whom the emperor Henry I. ceded it. Taken by the Spaniards in 1595, it was delivered to France by the treaty of Nimeguen (1678).

In World War I (1914-19) Cambrai was of special strategic importance as the converging point of four railways and numerous highways. It was occupied by the Germans in the early days of the war and was an important distributing station for the German armies. It was the objective of the great British drive begun on Nov. 20, 1917, but remained in the possession of the enemy until the autumn of 1918, when it was taken by the British (Oct. 9, 1918) in the Cambrai-St. Quentin advance.

**Cambrai, Battles of.** In the First World War, Cambrai was the scene of two important battles, the first, the British advance of November, 1917; and the second, the Allied

attack of September and October, 1918. See EUROPE, WORLD WAR I.

**Cambria**, the Latin name of Wales, and originally applied to both Wales and the Cymric kingdom of Strathclyde, but now restricted to the principality. See WALES.

**Cambrian System**, the name given to the great series of sedimentary deposits which come next in order of succession to the Archæan System.

In North America the Cambrian or Primordial system comprizes an upper series of shales and sandstones (Acadian series) and a lower one of sandstones, etc. (Potsdam series). These strata have been recognized in Newfoundland, Nova Scotia, New Brunswick, and Canada, and in the States of Massachusetts, Vermont, and New York.

The British Cambrian rocks are best developed in Northern Wales, and are also well represented in Shropshire, etc. They consist largely of coarse red and purple graywackes, sandstones, grits, and conglomerates, and grayish-blue and green slates and slaty shales. In Ross-shire and adjoining districts in the northwest of Scotland certain dark reddish-brown conglomerates and sandstones are found overlaying unconformably the Archæan rocks of that region, and are themselves covered unconformably by Silurian strata.

The Cambrian strata are for the most part unfossiliferous—organic remains being met with chiefly in the higher members of the system. Remains of plant life occur sparingly if at all. Animal life, however, is surprisingly well represented, as by sponges, sea-lilies, cystideans, and star-fishes. Worm-burrows and worm-castings often abound, and crustaceans are plentiful—the modern groups of water-fleas and brine-shrimps being represented. The most notable crustaceans, however, are the Trilobites, some of which were very minute and blind (agnostus), while others attained a length of 1 or 2 ft. The Brachiopods belong almost exclusively to the 'inarticulate' group—the three most characteristic forms being *Lingulella*, *Discina*, and *Bolella*. Four out of the five classes of Molluscs now existing appear in the Cambrian—*viz.*, lamelli-branches, pteropods, gasteropods, and tetrabranchiate cephalopods.

Cambrian rocks have been recognized in various other parts of Europe, as in Central and Southern Sweden, where the strata are not nearly so thick as in the British area. The most important continental area in Europe, however, is that of Bohemia.

**Cambrie**. See **Linen**.

**Cambridge**, capital of the English county of the same name, and site of Cambridge University, is about 55 m. n.e. of London. Besides the University buildings and grounds, features of interest are the Guildhall; Addenbrooke's Hospital; St. Sepulchre's, the oldest of the four round churches in England; Great St. Mary's, the university church, a fine specimen of Perpendicular Gothic; and St. Benedict's, the oldest building in Cambridge and an excellent example of Saxon architecture.

During the Roman occupation Cambridge was known as Grantbridge. It was burned by the Danes in 870 and again in 1010. In 1068 William the Conqueror erected a Castle for military operations on what is known as Castle Hill, but all traces of it have disappeared; p. 81, 463.

Cambridge University, one of the two ancient universities of England, probably dates from the 12th century, though the year and mode of its establishment are undetermined.

The university as a corporate body consists of the chancellor, the masters, and the scholars. The governing body (called the senate) consists of the chancellor, vice-chancellor, doctors of divinity, law, and medicine, science and letters, doctors of music, bachelors of divinity, and masters of arts, law, surgery, and music. The university sends two representatives to Parliament, elects the chief officers and examiners, and sanctions all degrees. They also elect 'the council of the senate,' a most important body of sixteen persons, which initiates all legislation, nominates the syndicates and persons by whom university business is carried on, and has a veto on every degree.

The colleges are separate corporations independent of each other, and, in most things, of the university. The head of King's College is called the provost, the head of Queen's College the president, the head of every other college the master. Fellows are those who have been co-opted into the governing body of the college. The university has very little income of its own. Its revenues are derived chiefly from fees for matriculation, examination, and degrees, and from the taxation of the colleges.

Members of the student body are of three classes: the scholars, chosen by examination and having certain privileges; the pensioners, who pay for their board and lodging and constitute the great majority; and the sizars, or poorer students who pay smaller fees and receive their commons gratis.



The University confers the degree of bachelor, in arts, divinity, law, medicine, music and surgery; master, in arts, law, music, and surgery; of doctor, in divinity, medicine, music, science and letters.

The colleges, seventeen in number, are as follows:

*Peterhouse*, or *St. Peter's*, the oldest college, was founded in 1284 by Hugh de Balsham, sub-prior of Ely.

*Clare College* was founded in 1326 by Dr. Richard Badwe, under the name of University Hall. In 1338 Elizabeth, Countess of Clare, founded her college, and in 1340 obtained possession of University Hall and decreed that it should be known as 'House of Clare.'

*Pembroke College* was founded in 1347 by Marie de St. Paul, widow of Aymer de Valence, Earl of Pembroke.

*Gonville and Caius College*, founded in 1348 by Edmund Gonville, rector of Terrington, Norfolk, was removed to its present site in 1352, and refounded in 1557 by Dr. John Kaye, or Caius, one of the great physicians of the sixteenth century.

*Trinity Hall*, founded in 1350 by William Bateman, bishop of Norwich, for the study of the canon and civil law.

*Corpus Christi*, or *Benet College*, was founded in 1352 by the town guilds of Corpus Christi and the Blessed Virgin Mary. The library contains the unique collection of manuscripts collected by Archbishop Parker, master from 1544 to 1553.

*King's College* was founded by King Henry VI. in 1441, but, in 1443, was connected with Eton.

*Queen's College* was founded in 1448 by Andrew Doket under the patronage of Margaret of Anjou, queen of Henry VI., and refounded in 1465.

*Jesus College* was founded in 1497 by John Alcock, bishop of Ely.

*Christ's College*, originally founded in 1439 by William Byngham, under the name of 'God's House,' was enlarged and practically refounded in 1505, by Lady Margaret Beaufort, mother of Henry VII.

*St. John's College*, in 1510 by a bequest of the Lady Margaret.

*Magdalene College* was founded in 1542 by Thomas, Lord Audley, to replace Buckingham College.

*Trinity College* was founded in 1546 by Henry VIII., by the union of King's Hall, Michael-house, Fyswick's Hostel, and some minor hostels.

*Rmmanuel College*, founded in 1584 by

Sir Walter Mildmay, occupies the site and buildings of the house of the Dominican friars.

*Sidney-Sussex College* was founded in 1588 by a bequest of the Lady Frances Sidney Sussex, on the site of the house of the Franciscan friars, and incorporated by charter of Queen Elizabeth in 1594.

*Downing College*, founded in 1800 by a bequest of Sir George Downing.

Mention should be made of Selwyn College (1882), a public hostel for members of the Church of England, and Fitzwilliam Hall, the headquarters of the non-collegiate students. Ridley Hall (1879-82), the Clergy Training School, St. Edmund's House (for candidates for the Roman priesthood), Westminster College (1899, for Presbyterian students of theology), and the two colleges for women, at Girton (1869) and Newnham (1875), have no formal connection with the university.

The Fitzwilliam Museum, a sumptuous building, contains a large collection of paintings, illuminated manuscripts, engravings, vases, coins, and gems. The new museums of science, with lecture rooms, laboratories, and workshops, cover a very large area and are centrally located on and near the site of the old botanical garden.

Consult C. Dickens's *Dictionary of the University of Cambridge*; *The Architectural History of the University of Cambridge*, by Willis and Clark; J. Bass Mullinger's *History of the University of Cambridge*; Atkinson's *Cambridge Described and Illustrated*; Humphry's *Cambridge: The Town, University and Colleges*; *Student's Handbook to the University and Colleges of Cambridge* (1919).

**Cambridge**, city, Maryland, the county seat of Dorchester county, is situated on the Choptank River; p. 10,351.

**Cambridge**, city, Massachusetts, one of the county seats of Middlesex county, is situated on the Charles River, which separates it from Boston. The city covers an area  $4\frac{1}{2}$  m. long by 1 to 2 m. wide. Harvard Square at the southwestern corner of Harvard University grounds is a converging point for all the interurban railways and chief thoroughfares. Cambridge has many beautiful residences and broad streets shaded by magnificent old trees. It is the seat of Harvard University with its many beautiful buildings, of the Episcopal Theological School, Radcliffe College, Massachusetts Institute of Technology, removed there from Boston in 1916, and Andover Theological Seminary. Other important buildings are the Craige house, which was Washington's headquarters and later oc-

cupied by Longfellow, and Elmwood, the home of James Russell Lowell. A tablet marks the location of the 'Washington Elm,' under which Washington is said to have taken command of the Continental Army in 1775.

Cambridge, although primarily a city of homes and an educational centre, nevertheless has a thriving and ever expanding industrial section. Three important printing establishments, the Riverside Press, the University Press, and the Athenæum, are located here.

The site of Cambridge was at first selected (1630) for the headquarters of the Massachusetts Bay Colony, but it was found to be less advantageous for commerce and defence than the peninsula of Boston. It was permanently settled under the name of Newtowne in 1631, and in 1638 the present name was adopted. In 1846 Cambridge was incorporated as a city. In the Civil War the first volunteer company was organized here. The city comprises Old Cambridge, North Cambridge, East Cambridge, Cambridgeport and a part of Mt. Auburn; p. 120,740. Consult Eliot's *History of Cambridge, Massachusetts* (1913).

**Cambridge**, city, Ohio, county seat Guernsey county; p. 14,739.

**Cambridge, George William Frederic Charles**, Second Duke of (1819-1904), son of Adolphus Frederic (1774-1850), first Duke of Cambridge, and second cousin of Queen Victoria, was born in Hanover. He became general commanding-in-chief in 1856, and was made field-marshal at the majority of the Prince of Wales (Nov. 9, 1862). In 1887 he became commander-in-chief, which rank he held until his retirement in 1895.

**Cambridge Platonists**, the name given to a number of distinguished philosophers of the English church in the seventeenth century, sometimes known to their contemporaries as 'Latitude Men.' They drew their inspiration mainly from the study of the Platonic philosophy and sought to reconcile reason and religion. See also LATITUDINARIANS.

**Cambridgeshire**, an inland county of England, lying n. of Hertfordshire and Essex, s. of Lincolnshire, e. of Huntingdonshire, and w. of Suffolk and Norfolk. It is oblong in shape, about 50 m. long and 30 m. wide, and contains approximately 860 sq. m.; p. 129,594.

**Cambuslang**, parish and town in North-western Lanarkshire, Scotland, on the Clyde River; a residential suburb of Glasgow; p. of the parish, 26,130.

**Cambusnethan**, parish and village, Mid-Lanarkshire, Scotland; p. 32,730.

**Cambyses**, (?-522 B.C.), king of the Medes and Persians, was the son of Cyrus the Great. He succeeded his father on the Persian throne, reigning from 529 to 521 B.C. His great achievement was the conquest of Egypt in 525, during which he treated the Egyptians and their religion with great severity.

**Camden**, village, Knox county, Maine, on Penobscot Bay; 8 m. n. of Rockland and 15 m. s. of Belfast. Camden was founded in 1769 by James Richards and was incorporated in 1791. It was named for Lord Camden, Lord High Chancellor of England; p. 3,670.

**Camden**, city, New Jersey, county seat of Camden county, is situated on the left bank of the Delaware River.

The Industries are widely diversified and include ship-building, making of canned soup, brick works, foundries, machine shops, woolen mills, chemical works, etc.

In 1773 Jacob Cooper, a merchant of Philadelphia, laid out a town plot of forty acres, calling it Camden in honor of Charles Pratt, the first Earl of Camden. In 1828 it was incorporated as a city and in 1850 a new charter was obtained, which was revised in 1871, at the addition of new territory; p. 124,555.

**Camden**, city, South Carolina, county seat of Kershaw county, is situated on the Wateree River. The town was founded in 1758 by Joseph Kershaw, an Irish Quaker. On August 16, 1780, General Gates was defeated here by the British General Cornwallis at the battle of Camden; p. 6,986.

**Camden, Battle of**, a battle fought at Sanders Creek, near Camden, S. C., on Aug. 16, 1780, between a British force of about 2,200 under Lord Cornwallis and a superior American force, consisting mostly of untried militia, under Gen. Horatio Gates, who was decisively defeated. The battle of Hobkirk's Hill, in which General Greene was defeated by the British, April 25, 1781, is often spoken of as the second battle of Camden. Consult Carrington's *Battles of the American Revolution*.

**Camden, Charles Pratt**, First Earl of (1714-94), lord chancellor of England, was born in London. He became attorney-general in 1757, and in 1761 was appointed chief-justice of common pleas, in which capacity he championed John Wilkes by pronouncing illegal the issue of general warrants by the government. He was created baron (1765).

and as lord chancellor (1766) he continuously opposed the government in its American policy and its treatment of Wilkes.

**Camden Town.** See London.

**Camden, William** (1551-1623), English antiquary and historian, was born in London. He was commissioned by James I. to translate into Latin the account of the trial of the Gunpowder Plot conspirators. He founded his professorship of history at Oxford in 1622. His most celebrated work, *Britannia*, a survey of the British Isles, first appeared in 1586, and was translated from Latin into English by Philemon Holland in 1610. Consult *Life* by T. Smith and Wood's *Athenæ Oxonienses*.

**Camel**, a large ruminant of the genus *Camelus*, and constituting, with the llama of South America, the family *Camelidæ*. The camel has for centuries been subservient to man and is unknown in a wild state, although in some localities half-wild herds roam about—the offspring of animals which undoubtedly escaped from captivity. There are two distinct species of camel, the *Camelus dromedarius*, commonly known as the dromedary, and the *Camelus bactrianus*, or Bactrian camel. The dromedary or true Arabian camel, is characterized by a single hump, which forms a regular pyramid and constitutes about one-fourth of the length of the body. The dromedary occurs in both Africa and Asia and has been successfully introduced into Australia. The Bactrian, peculiar to Central Asia, differs from the Arabian species in having two humps; it is also a shorter and stockier animal with longer and more abundant hair, and is better fitted for the rigorous climate of the Tibetan Plateau.

Animals of both species are large and ungainly, with long necks and fatty humps on the back and long, shaggy hair, reddish-brown in color, covering some parts of the body only. Because of the fat reserve in the hump and the peculiar formation of the stomach, camels can exist for long periods with little food and water, and are, therefore, especially valuable in desert transportation.

**Camel**, an apparatus used for raising a ship over shoal water.

**Camellia**, a genus of Asiatic evergreen trees and shrubs belonging to the order Ternstroemiaceæ and closely allied to the Tea family. The best known species of camellia is the common *C. japonica* (the parent of most of our garden forms) which grows to a height of 30 ft., and bears reddish flowers about 4 inches in diameter.

**Camelopardalis**, a northern constellation between Ursa Major and Cassiopeia.

**Camelot**, in Arthurian romance the seat of King Arthur and the knights of the Round Table.

**Camel's Hair**, the long hair of the camel, which is shorn every summer, is woven into clothing, tent-covers, and ropes.

**Camel's Thorn**, a spiny shrub, native of West Asia.

**Camenæ**, in Roman mythology, prophetic nymphs, often identified with the Greek muses.

**Cameo**, a gem cut or engraved in relief. The art of cameo-cutting consists in carving out a figure in the upper of two differently colored layers of stone so that it stands out in relief on a darker ground. The phrase has been loosely applied to all sorts of lapidary work. It is said that the Egyptian scarabæus is doubtless the origin of the cameo. Genuine antique cameos signed by the artist are extremely rare. Names of possessors were, in the antique and early Christian epochs, graven on the gem itself; later, on the metal mounting only.

**Camera.** See Photography.

**Camera Lucida**, the name given to an instrument in different forms used to project an image off the line of sight; the same principle is used in the submarine periscope. Wollaston's model is used for making outline sketches of distant objects. A prism, ABCD in diagram, is set, in a compound microscope, about 1 ft. from the table with its upper face horizontal. The object M is reflected at H and K, to the eye at E, which sees the image at N, and also the pencil at N'. The pencil and image are seen together upon the paper and thus the image of the object M can be traced. The amateur microscopist can achieve equally satisfactory results by fixing a small plate of transparent and polished glass to the eye piece of his microscope, so that it will make an angle of 45° with the axis of the tube, using for this purpose a small ball of adhesive wax.

**Camera Obscura**, (Lat. 'dark chamber'), so called by Battista della Porta in 1558, because the form described was really a dark room lighted only by a hole in the window shutter allowing the rays from without to pass through a convex lens. At the focal distance a sheet of white paper, especially if curved to suit the focal distance, will very faithfully show the figures of the objects opposite the lens, with their proper colors and motions.

**Camerarius, Joachim** (1500-74), German humanist and classical scholar. His works include a biography of Melanchthon (1566), excellent editions and translations of Greek and Latin writers. He was a friend of Erasmus and Melanchthon. His son JOACHIM (1534-98) was a distinguished physician and botanist.

**Camerarius, Rudolph Jakob** (1665-1721), German physician and botanist, laid the foundation of the sexual theory of plants in his *Epistola de sexu Plantarum* (1694).

**Camerino**, city, Italy, seat of a 'free' university, founded in 1727, and the chief industry is silkworm rearing; p. 12,000.

**Camerlengo**, (It. 'chamberlain'), the cardinal in charge of the financial and judicial interests of the Holy See.

**Cameron, Sir Charles Alexander** (1830-1921), agricultural chemist, Royal College of Surgeons, Ireland. He published *Chemistry of Agriculture* (1857), *Lectures on Public Health* (1868), etc.

**Cameron, Sir David Young**, (1865-1945), painter and etcher, born at Glasgow, honored in Europe and America. His works include *North Holland* (1892); *The London Set* (1900); Etchings in Belgium (1907).

**Cameron, Donald** (c. 1695-1748), Scottish chief, known as 'The Gentle Lochiel'.

**Cameron, Sir Duncan Alexander** (1808-88), British general.

**Cameron, Edgar Spier** (1862-1944), American painter, chiefly of murals, having been in charge of murals at World's Fair, Chicago, 1893. He won prizes in America in 1913 and 1917. Marie Cameron, portrait painter, was his wife.

**Cameron, George Frederick** (1854-85), Canadian poet, whose verse is marked by strong emotion. He wrote *What Reck We of the Creeds of Men?*

**Cameron, James Donald** (1833-1918), American politician, son of Simon Cameron, in many respects the political heir of his father and long influential as a Republican. He is generally known as 'Don' Cameron.

**Cameron, John** (?1579-1625), Scottish scholar and theologian, persecuted because of his advocacy of the divine right of kings and the doctrine of passive obedience.

**Cameron, Richard** (c. 1648-80), Covenanting leader, was born at Falkland in Fife.

**Cameron, Simon** (1799-1889), American political leader, born at Maytown (now Donegal), Pa. He received little education, but showed a remarkable aptitude for politics. He was also notably successful in business and

accumulated a large fortune. Cameron was undoubtedly one of the shrewdest, most adroit, and most astute of politicians in the history of the U. S.

**Cameron, Verney Lovett** (1844-94), African traveller, born in Dorsetshire, England.

**Cameronians**, a sect of Scottish Presbyterians, originating in the latter part of the 17th century, deriving their name from their chief leader, Richard Cameron, who, with his colleagues, John Semple, Alexander Peden, and John Welwood, definitely separated themselves from the great body of Presbyterians in Scotland, on the question of the spiritual independence of the church. With high spiritual feeling they combined the fiercest fanaticism, and many of them were so ignorant as to ascribe supernatural and prophetic power to Peden, Cameron, and Semple.

The Cameronians are still represented by a few congregations bearing that name. They prefer themselves to be called 'Reformed Presbyterians,' and as such have a few representatives in the United States.

**Cameroon**. See *Kamerun*.

**Camiguin**, isl., Misamis prov., Philippine Islands; p. all civilized, 30,754.

**Camilla**, a virgin in Roman fable, who was a very swift runner.

**Camillus, Marcus Furius**, one of the early heroes of Rome, perhaps the first who is a character of history rather than of legend. He was censor in 403 B.C., military tribune with consular powers six times, and dictator five times.

**Camisards**, the Protestants of the Cévennes who rose in arms after the revocation of the Edict of Nantes (1685). They obtained their name from the white shirt (*camise*) which they adopted as a uniform.

**Camlet**, a rich fabric which during the middle ages was made from camel's hair but now is generally made from the hair of the Angora goat, mixed with silk, wool, or cotton.

**Cammaerts, Emile** (1878- ), Belgian poet, author of *Belgian Poems* (1915); *The Treasure House of Belgium* (1924); and other volumes.

**Camoens, or Camoes, Luiz de** (1524-80), the greatest of Portuguese poets, was born at Lisbon in 1524. When only 16 he had already written his *Amphitrides*. His most celebrated work, the *Lusiads*, was published in 1572. The poem proved an immediate success; but its unhappy author after an extremely adventurous life died in the public hospital on June 10, 1580.

**Camomile**. The camomile, or chamomile

(*Anthemis nobilis*) is much cultivated in Europe as a medicinal herb. The whole of the plant has an aromatic fragrance, whence it derives its name of chamomile.

**Camorra**, a secret society in S. Italy, which took its rise during the times of Bourbon misgovernment in the former kingdom of Naples about 1820. While mainly composed of the poorer criminal classes, banded together to evade and defy the law, it also included many associates from the upper classes, who carried on their lawless schemes with its aid. Its energies were chiefly directed to extortion, smuggling, brigandage, and more serious crimes. The members were bound together by a stern and exacting discipline, and as a rule faithfully observed the oath of secrecy under which they worked. In spite of attempts to curb its power, the organization survived, and toward the end of the nineteenth century it assumed the aspect of a political party. In 1912 most of the leaders were imprisoned after a long trial.

**Camouflage**, (literally, 'faking'), a term adopted from the French theatrical vocabulary (in which it signifies the process of 'making up') to describe the new military art of so concealing or disguising an object that the enemy cannot recognize it. The practice of camouflage is not entirely new, as is evidenced by the screening of trench furrows with leaves and sod in earlier wars. As a military art, however, it has received recognition only since the outbreak of the World War, and the introduction of the aeroplane for observation purposes.

The simplest forms of camouflage are those which employ natural means of protection, as screens of leaves and boughs, or stacks of hay; but these are at best of limited application. To meet the requirements of modern warfare artificial means must be resorted to. A plan has been adopted based on the protective coloration observed in birds and animals. High lights are darkened; under surfaces are lightened with colors in general harmony with the surroundings; outlines are broken by irregular streaks and blotches of color; wheels and other prominent projections draped with painted cloth; and the whole screened with reed or leaf nettings.

The concealment of roads, a later development, has become of vital importance for the transportation of supplies and troops.

Another phase of camouflage is the introduction into the landscape of objects intended merely to distract the enemy. 'Fake' trenches are dug in such a way that they ap-

pear to be part of the real trench system; dummy guns are interspersed with real ones and sheds, barracks, and headquarters are simulated by clever scene painting in order to draw the fire of the enemy's guns. Camouflage is also extensively used on ships at sea. For an excellent illustration of camouflage, see **TANK, MILITARY**. Consult Breckenridge's *Modern Camouflage*.

**Camp, MILITARY.**—**ROMAN.**—The Roman camp of the Polybian period surrounded the *prætorium*, or consul's tent, the whole camp lying within an exact square whose sides measured 2,017 Roman ft.

**MODERN CAMPS.**—Camps are of various kinds, depending upon the length of occupancy, the military situation, the character of communication with the base, and the facilities afforded by the country. In time of peace and when not in the presence of the enemy, camp grounds which are to be occupied for some length of time are selected with great care; but in the presence of the enemy every consideration must give way to military necessity. The troops must find such shelter as the enemy will allow them, often being reduced to the necessity of lying out in the open without shelter of any kind.

It is a military axiom that to maintain the efficiency of any command the troops must have adequate shelter.

The camp used in active service in the field is composed either of tents or of huts, or it may be merely a bivouac where shelter from the weather is temporized out of branches, straw, or any handy material. In the U. S. Army the tents used are pyramidal, common, and wall tents for ordinary camps. In addition to this, each man carries one-half of a shelter tent, which when set up affords excellent protection to two men. Huts are used only when an army is occupying a defensive position for a long time, during a siege, when resting in winter quarters in a hostile country, waiting for seasonable weather, etc.

During the temporary occupation of any territory by a large body of troops (as was the case with U. S. troops in parts of Cuba and the Philippine Islands), camps are established with more or less permanent buildings of wood or thatch for shelter of troops.

In a permanent or semi-permanent camp, more attention is given to shelter and sanitation and to the comfort of the troops. The troops are sheltered in pyramidal tents, and various conveniences are added, the number of such usually varying with the length of

occupancy. If occupancy is to be for a considerable period tent floors, frame kitchens and mess halls, bathing and toilet facilities may be added and water and sewer systems installed; or tents may be replaced by huts or barrack buildings constructed. In this case the camp becomes a cantonment. In the U. S. both camps and cantonments are called camps to distinguish them from permanent posts, which are called forts and are established by act of Congress. See CANTONMENT; SANITATION, MILITARY.

**CONCENTRATION CAMPS.**—Guarded areas set aside for confinement of political enemies, refugees, aliens, military prisoners.

**Camp, Walter** (1859-1925), American sports writer, published: *Book of College Sports*; *Book of Football*; *Auction Bridge up to Date*; *American Football*.

**Campagna, Roman** (*Campagna di Roma*), the undulating, marshy plain, of volcanic formation, which stretches for 90 m. along the coast of the Tyrrhenian Sea, near Rome. It is divided into vast estates leased to tenants or companies of capitalist farmers. The prevalence of malaria left the Campagna a desolate waste, but in recent years drainage, the regulation and embankment of the Tiber and other rivers, the reclamation of the riverine tracts, the screening of windows and doors, and the planting of eucalyptus trees have greatly diminished the extent and violence of the disease.

**Campaign Expenses.** See Elections.

**Campaign, Military.** See Army in the Field.

**Campaign, Political.** See Elections.

**Campan, Jeanne Louise Henriette** (1752-1822), French teacher and became the first lady of the bedchamber to Marie Antoinette. Her best known works are: *Mémoires de la Vie Privée de Marie Antoinette* (1823); *Correspondance Inédite avec la Reine Hortense* (1835).

**Campanari, Guisepppe** (1858-1927), Italian operatic singer and cellist, spent most of his life in America playing with the Boston Symphony Orchestra and singing with various opera companies, including the Metropolitan.

**Campanella, Tommaso** (1568-1639), Italian philosopher. Accused of political heresy he was imprisoned for 27 years and declared the author of a book which had been published thirty years before he was born. When released he went to Paris and devoted himself to philosophy. The contemporary of Bacon, he produced more than 80

works, including *De Sensu Rerum* (1620); *De Monarchia Hispanica Discursus* (1640; Eng. trans. 1654); *Philosophia Rationalis* (1638); *Civitas Solis* (1643; new Eng. trans. 1885), which describes an ideal communistic organization of society on the model of Plato's *Republic*.

**Campanero.** See Bell Bird.

**Campania**, a province of ancient Italy, coinciding practically with the modern provinces of Avellino, Benevento, Caserta, Naples, and Salerno, rich in classic reminiscences, chiefly owing to its associations with celebrated men—Cicero, Augustus, Nero, and Hadrian, and its mythological sanctity—Lake Avernus and the Sibyl's Cave.

**Campanile** (Italian, 'belfry' or 'steeple'), literally the name of any bell tower, is particularly applied to the tall, graceful, and usually rectangular structures that form a striking adjunct to many churches and palaces of Italy. Among the most famous Italian campaniles is the Leaning Tower of Pisa, circular in form, and decorated with columns and arcades to the summit of its eight stories. Its construction was begun in 1170, and it was to have been carried up vertically; but the work was interrupted, and when resumed in 1298 it was seen that the part already built had taken a certain slant. To preserve the existing structure the line of inclination was followed, but the horizontal level of the stories was retained by increasing the height of the lower arches. At the opening of the nineteenth century its inclination was 8.6 per cent. of its height; to-day it has reached 9.2 per cent.

Perhaps the noblest of the Italian campaniles is that of St. Mark's in Venice, founded in 888, and completed to the platform in 1170. The *loggia* was added in 1349. Founded upon a rectangular base of Istrian stone, its brick walls taper gently to a height of 200 ft. in a series of eight stories pierced with windows. Above the platform rises an open *loggia* of marble 50 ft. high, being the actual belfry, wherein hang five great bells of bronze. This is surmounted by a copper figure of an angel 16 ft. high, the total height of the campanile being thus 325 ft.

On July 14, 1902, this Campanile suddenly collapsed, and from 1903 to 1911 it was rebuilt as nearly like the old one as possible, the principal modifications being enlarged and strengthened foundations and a powerful hidden framework of iron.

**Campanini, Cleofonte** (1860-1919), Italian operatic conductor and director, brother of Italo Campanini, conducted opera in New

York, Naples, Venice, Rome, London, Milan, Chicago and Philadelphia.

**Campanini, Italo** (1846-96), Italian singer. His voice was a true tenor of great power and sweetness, and his repertory comprised about 100 operas and oratorios.

**Campanology**, the art of bell ringing. See **BELL**.

**Campanula**, or **Bell Flower**, a genus including about 300 species and numerous varieties. They are confined to the Northern Hemisphere, and find most favorable conditions in England.

The following are the most beautiful kinds: *C. pyramidalis*, which bears spikes of blue flowers often 3 or 4 ft. in height; the Peach-Leaved Campanula, about 2 ft. high, with white and blue varieties; and *C. rapunculoides*, a tall bluebell, whose leaves are used for salad. The slender and graceful Harebell, 'the blue bell of Scotland,' is *C. rotundifolia*.

**Campanularia**, a common genus of Hydroids.

**Campbell**, family of. See **ARGYLL**.

**Campbell, Alexander** (1788-1866), principal founder of the religious denomination known as the Disciples of Christ, was a native of Antrim, Ireland. He emigrated to the United States in 1809. In 1812 he formed a connection with the Baptists, and labored as an itinerant preacher. By his discussions, Campbell gradually formed a large party, who about 1827 organized the Protestant sect known as Christians or Disciples of Christ. In 1841 he founded Bethany College in West Virginia.

**Campbell, Bartley** (1843-88), American dramatist. In 1868 he founded the Pittsburgh *Evening Mail*. His first play, *Through Fire*, was followed by *Peril*, *The Big Bonanza*, *Matrimony*, and others.

**Campbell, Sir Colin, Lord Clyde** (1792-1863), British general, the son of a carpenter in Glasgow. He commanded a brigade in the Crimea, and was instrumental in winning the Battle of the Alma. On the outbreak of the Indian Mutiny he was made commander-in-chief, and by a masterly campaign completed the capture of Lucknow and the pacification of Northern India. He was made field marshal, and raised to the peerage.

**Campbell, Douglas** (1839-93), American lawyer and writer. He wrote largely on American history. His book, *The Puritan in Holland, England, and America*, first published in 1892, laid down the proposition that the United States obtained her political institutions from the Dutch.

**Campbell, John, Baron** (1779-1861), British jurist and author, was appointed Lord Chief Justice in 1850; and became Lord Chancellor of England in 1859.

**Campbell, John Archibald** (1811-89), American jurist. He published *Reminiscences of the Civil War* (1887).

**Campbell, John Francis**, of Islay (1822-85), was born in Islay, and died at Cannes. He was a keen and diligent collector of Highland oral tradition, and his *Popular Tales of the West Highlands*, together with his *Leabhair na Fèine* ('Book of the Fians'), is the best collection of genuine Gaelic tales and ballads.

**Campbell, John M'Leod** (1800-72), Scottish divine. In 1856 he published a work called *The Nature of the Atonement*, which placed him in the front rank of living theologians.

**Campbell, Sir Malcolm** (1885-1949), British automobile racer who in 1935 established a world's land speed record of 301.12 miles an hour; since surpassed by Eyston and Cobb. Campbell made world motorboat speed record of 141.74 miles per hour, 1939. He was an aviator in the Royal Flying Corps during World War I and took up automobile racing when the war ended.

**Campbell, Mrs. Patrick** (1867-1940), Eng. actress, born Beatrice Stella Tanner at Kensington, London. After making dramatic tours she ventured to take the Shaftesbury Theatre in order to make trial of *Rosalind*. At the Adelphi she created four parts, including Astrea in *The Trumpet Call*. She achieved a brilliant success in the title rôle of *The Second Mrs. Tanqueray*. She appeared regularly in America in her most successful plays, and in moving pictures. Patrick Campbell, to whom she was married in 1884, fell in the South African War of 1900. In 1914 she married George Cornwallis West. In 1914 she played the lead in Shaw's *Pygmalion* in New York, but did not appear again in that city until 1934, when she played in Ivor Novello's *Party*. See her *My Life and Some Letters* (1922).

**Campbell, Reginald John** (1867), Congregational minister, was educated at Christ Church, Oxford, and became (1895) minister of Union Street Church, Brighton. After the death of Dr. Parker (1903) he was made pastor of the City Temple, London. He actively opposed the Education Act of 1902, urging all whom he addressed to join in the Passive Resistance movement. Shortly after he inaugurated the 'New Theology' movement, which

finally separated him from orthodox Nonconformity. In 1909 he became joint minister of the Weigh House Chapel, London. In the fall of 1911 he visited the United States and aroused resentment at Philadelphia by his remark that the unsuccessful business man was the honest man. He is the author of *The New Theology* (1907); *Christianity and the Social Order* (1908).

**Campbell, Thomas** (1777-1844), British poet, was born in Glasgow.

Campbell survives almost entirely by his war songs, notably *Ye Mariners of England*. Some of his shorter pieces, such as *Lord Ulin's Daughter* are popular in certain circles.

**Campbell, William** (1745-1781), American Revolutionary hero, born Augusta co., Va. Under his command the Virginians who formed the "rear guard of the Revolution" made the famous assault on Kings Mountain.

**Campbell, William Wallace** (1862-1938), American astronomer. Director Lick Observatory; president of the University of California from 1923-1930. He published: *The Elements of Practical Astronomy* (1899); *The Return of Halley's Comet* (1909); *Stellar Motions* (1913).

**Campbell, William Wilfred** (1861-1919), Canadian poet. Bibliographer of the Dominion Archives and Records Office, and wrote a large amount of verse and several poetical dramas. Among his works are: *The Scotsman in Canada* (1911); *Oxford Book of Canadian Verse* (1914).

**Campbell-Bannerman, Sir Henry** (1836-1908), British statesman, familiarly known as 'C.-B.' He was Parliamentary representative for the Stirling Burghs from 1868 until his death. His official career began as financial secretary to the War Office in Gladstone's government. During the last year of Gladstone's administration he was Chief Secretary for Ireland. On the formation of the Home Rule government in 1886, he was made Secretary of state for War. In 1897 he was a member of the Jameson Raid Committee.

On the resignation of A. J. Balfour's government in December, 1905, Sir H. Campbell-Bannerman was commissioned by the King to form a Liberal Cabinet. He brought self government to the Transvaal and the Orange Free State.

**Campbell Island**, an uninhabited, mountainous, peaty, wooded island, the most southerly land of New Zealand. It was discovered in 1810 by Captain Hazelburgh.

**Campbellton**, seaport, Restigouche county, New Brunswick, Canada; p. 5,570. Fish-

eries and lumbering offer the chief occupations.

**Campe, Joachim Heinrich** (1746-1818), German educationist. Duke Karl Wilhelm Ferdinand invited him to reform education in Brunswick. In 1779 appeared his *Robinson*, based on Defoe's work, which attained immense popularity. He issued, in sixteen volumes, his *Allgemeine Revision des Gesammten Erziehungswesens*, a journal which did much to popularize and render practicable Rousseau's ideas on education. He then endeavored to purify the German language. Consult *Leyser's Life* in German.

**Campeador, El.** See **Cid Campeador**.

**Campeche, or Campeachy**, state of Mexico, occupies the western part of the peninsula of Yucatan; p. 122,093. Tropical fruits of all kinds grow luxuriantly, and logwood (Campeche wood), cotton, indigo, and wax are exported.

**Campeche, or Campeachy** (*San Francisco de Campeche*), town and seaport, capital of Campeche state, Mexico. It has a citadel, university, naval academy, and shipbuilding docks. Cigars and palm-leaf hats are the principal manufactures; p. 16,938.

**Campeche Wood.** See **Logwood**.

**Campeggio, Lorenzo, Cardinal** (1474-1539), visited England as papal legate to incite Henry VIII. against the Turks. In 1524 he obtained the bishopric of Salisbury. He was despatched to England to hear the divorce suit of Henry VIII. against Catherine of Aragon.

**Camper, Pieter** (1722-89), Dutch naturalist and anatomist, was born in Leyden. He made many important discoveries in natural history, among them the auditory organs in fish.

**Camperdown**, village on the North Sea, Netherlands.

**Camperdown**, western suburb of Sydney, New South Wales, Australia, containing the Sydney University.

**Camperdown, The Battle of.** On Oct. 11, 1797, the British Admiral Adam Duncan bore down upon the Dutch under De Winter. The action was bloody and resulted in a decisive victory for the British.

**Camp Fire Club of America**, an association of American sportsmen and nature lovers, having for its objects the promotion of local and national measures for game protection and forest preservation.

The club has played an important part in rescuing the fur seals from slaughter; in the establishment of Glacier National Park, and



in other State and national movements for conservation.

**Camp Fire Girls, Inc.**, is an organization for girls ten years of age or older. It was founded in 1912 by a group of educators. Many of the features were first developed at the camp for girls conducted by Dr. Luther Gulick and his wife.

From six to twenty girls may form a Camp Fire group. Activities are grouped under the Seven Crafts: Camping, Home Craft, Health and Hand Craft, Nature Lore, Business and Citizenship. There are over seven hundred 'honors' or things suggested for Camp Fire Girls to do for the successful accomplishment of which they earn honor beads.

**Camphausen, Otto von** (1812-96), Prussian statesman. He was vice-president of the ministry 1873-8.

**Camphausen, Wilhelm** (1818-85), German historical and battle painter.

**Camphene**, ( $C_{10}H_{16}$ ), a solid hydrocarbon, crystallizing in white prisms. It smells like turpentine and camphor, and exists in a dextro and laevo modification.

**Camphine**, the trade name of a purified spirit of turpentine.

**Camphor**, a volatile, semi-transparent, crystalline substance, with a characteristic penetrating odor and an aromatic, cooling taste, obtained from various species of laurel, notably the Camphor Laurel (*Laurus* or *Cinnamomum camphora*).

The camphor tree is a handsome, dense topped tree, a native of Southeastern Asia, whence its cultivation has been introduced into Ceylon, Malaya, Italy, and the United States.

The bulk of the camphor of commerce comes from Japan and Formosa. The wood or leaves are cut into chips and distilled with water; the vapor of the camphor rises from the steam, and is conducted to a receptacle, where it is allowed to cool and condense; and the oil of camphor is allowed to drain off.

**Artificial or Synthetic Camphor** is prepared by a number of processes based upon the conversion of pinene, a hydrocarbon existing in the volatile oil of turpentine.

Camphor has been used for many years as an insecticide and in medicine.

**Campi**, a family of artists of Cremona in Italy. **GALEAZZO CAMPI** (1475-1536), painter, was the father of three more famous sons. **GIULIO CAMPI** (1500-72), painter, influenced chiefly by the style of Giulio Romano, has left fine specimens of his art at Cremona and Milan. **ANTONIO CAMPI** (1536-92), architect,

painter, and historian, composed a *Chronicle* (1585) of Cremona adorned with plates of his own engraving. **VINCENZO CAMPI** (1532-91), devoted himself to portraiture and still life. **BERNARDINO CAMPI** (1522-90) may have been related to Galeazzo and Vincenzo. His great work in the cupola of San Sigismondo represents the assembly of Old and New Testament saints. In the Louvre is his *Mater Dolorosa*.

**Campinas**, city, Brazil. It has one of the finest churches in Brazil—the Church of the Conception. There are large coffee and sugar plantations in the surrounding district; implements, hats, and cotton goods are manufactured; p. 101,746.

**Camping**, a form of recreation which generally implies living more or less simply out of doors, with a tent of some kind for shelter.

Equipment for a camping trip varies with the time of year, the location of the camp, the size of the camping party, and other matters, but in general it should include, beside the tents, beds and blankets, a cook-kit, of which there are several on the market, a medicine kit, warm, light, and durable clothing, a clock, a lantern or flashlight, if possible a hay-box cooker, matches, soap, an axe, and such canned food as will be necessary to supplement what is likely to be obtained by hunting and fishing. Milk and eggs are often obtainable within a reasonable distance.

A popular form of camping, coincident with the growing use of the motor car, is motor or auto camping. Many of the outfits used in motor camping are combination beds and tents. Auto campers who desire a maximum of comfort use a trailer, weighing between 500 and 800 pounds, which is towed behind the car, bearing tents, beds, provisions, and utensils, and leaving the car itself free from clutter.

The 'tourist camp' is a development made necessary by the great increase in automobile travel. Along the main highways throughout the country have been established bungalow communities with facilities for storage and service of cars, where the motor tourist may interrupt his journey for as long a time as he pleases, purchasing supplies from stores on the grounds and preparing his meals in a community kitchen.

The last twenty-five years have witnessed a great development in agencies devoted to the promotion, for brief periods at least, of out-of-door living. These agencies may be generally divided into three classes: (1) private individuals and organizations conducting

camps for profit; (2) private organizations conducting camps without profit; and (3) public associations providing opportunities for camping.

The majority of organized camps in the United States are conducted by private organizations for civic, social, recreational, or educational purposes.

In practically all organized camps a more or less definite programme of work and play is carried out. Good leaders, or counsellors as they are called, are of prime importance in an organized camp.

Consult Gibson's *Camping Out for All* (1919); Brummer's *Autocamping* (1923); Brooks' *A Handbook of the Outdoors* (1925); Wack's *The Camping Ideal* (1925); A. H. Townsend's *Camping and Scouting Lore* (1930); Wm. Hillcourt's *The Boy Campers* (1931).

**Campion**, the common name of plants belonging to the genera *Lychnis* and *Silene*.

**Campion, Edmund** (1540-81), English Jesuit, was born in London. After studying in the English College at Douai, he openly recanted (1572) Protestantism, and was chosen by the Society of Jesus for the mission to England (1580), during which he preached with such effect that wavering Catholics drew to him in crowds. He was beatified in 1886. Consult Simpson's *Life*.

**Campion, Thomas** (c. 1567-1620), English poet and composer of music. He seems to have become a member of Gray's Inn, but turned from law, and practised as a physician. His works include: *Epigrams* (Latin, 1595, 1619); *A Book of Airs* (with Philip Rosseter, 1601); *Observations in the Art of English Poetry* (1602). His *Collected Works* were edited by Bullen.

**Camp Meetings**, religious gatherings, of several days duration, held out of doors in temporary encampments. In earlier times they were often marked by emotional preaching and much religious excitement. Consult Swallow's *Camp Meetings*; James' *Varieties of Religious Experience*.

**Campoamor y Campoosorio, Ramon** (1817-1901), Spanish man of letters and legislator, was born in Navia, Asturias. He was one of the most popular poets in Spain, and claimed to be the creator of two new genres of poetry, the *dolora* and the *pequeño poema*. The *doloras*, his first collection of which appeared in 1856 (18th ed. 1890), illustrate or enforce some moral or philosophical idea; while the *pequeño poema* is a novel or novelette in verse, turning upon a social or psy-

chological theme. The author's best productions, however, are his lyrical works (*Obras poéticas*, 1900), some of his shorter sentimental poems being notable for their highly polished diction. Consult Boris de Tannen-berg's *La poésie Castellane contemporaine*.

**Campobasso**, town, capital of the province of Campobasso, Italy. It lies in the heart of the Neapolitan Apennines, has a ruined castle and walls, cathedral, and market, and manufactures cutlery; p. 12,118.

**Campobello**, island in the Bay of Fundy, New Brunswick, Canada. It is a popular summer resort; p. 1,250.

**Campodes**, a small insect—widely distributed over the world—which has acquired considerable importance from the fact that it has been supposed to be the nearest living representative of the ancestral insect.

**Campo Formio**, village, Venetia, Italy. Here, on Oct. 17, 1797, a treaty was signed between Austria and Napoleon giving Belgium to France and Venice to Austria.

**Campomanes, Pedro Rodriguez, Count of** (1723-1802), Spanish statesman and writer. He wrote the first Spanish work of any value on political economy.

**Campo**, a Brazilian word for *savannas*, or stretches of land intermediate between forest and grass land.

**Campo**, city, state of Rio de Janeiro, Brazil. After the capital, it is the largest and healthiest city of the state; p. 63,384.

**Campo, Arsenio Martinez de** (1831-1900), Spanish general and statesman, was born in Segovia. He became governor of Madrid and president of the Senate, and during the minority of Alfonso XIII. was the trusted adviser of the queen-regent.

**Campo Santo** ('holy field'), the Italian and Spanish name for a cemetery or burying ground. The walls of the famous Campo Santo of Pisa are covered with frescoes.

**Campo-Salles, Manoel Ferraz de** (1840-1913), Brazilian statesman; President of Brazil, serving until 1902.

**Campu-Lung**, or **Kimpolung**, town, Roumania, capital of the province of Muscel. It has Roman remains, and was the first capital of Walachia, in the fourteenth century; p. 13,500.

**Campus**, a Latin term signifying 'a field.' In the United States, the term is used for a college green.

**Camtoos**. See **Gamtoos**.

**Camuccini, Vincenzo** (1775-1844), Italian painter. The school of which he became the head was founded on the theatrical an-

tique style of the French painter David. His *Incredulity of Thomas* was copied in mosaic for St. Peter's.

**Camulodunum**, the old Roman name of COLCHESTER.

**Camus, Armand Gaston** (1740-1804), French revolutionist, deputy to the States-General and to the National Convention and one of the accusers of Louis XVI. In 1796 he was president of the Council of Five Hundred.

**Camwood**, a wood from which an important red dye is obtained. The tree (*Baphia nitida*) is a native of Angola, West Africa.

**Cana of Galilee**, the scene of Christ's first recorded miracle.

**Canaan**, ('low land'), the name originally applied to the low coast land of Israel on the Mediterranean. At a later period, the name Canaan became extended to the whole country. See PALESTINE.

**Canaanites**, according to Genesis the descendants of Canaan, the son of Ham and grandson of Noah, who inhabited Palestine previous to the Israelite invasion. In the Old Testament, the name is frequently used to include all the heathen between the Jordan and the Mediterranean. See PALESTINE.

**Canada, Dominion of**, comprises the whole of the northern half of the North American Continent, with the exception of Alaska, which belongs to the United States. Newfoundland with its dependency Labrador, the boundaries of which were extended by the British Privy Council, on Mar. 1, 1927, at the expense of Canada, became Canada's tenth province in 1949. From east to west Canada is divided into the following provinces: Nova Scotia, Prince Edward Island, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, Alberta, and British Columbia. The remainder is included in the two territorial districts of Yukon and the Northwest Territories. The provinces and districts thus comprised in the Dominion of Canada cover an area of 3,845,144 sq. m., of which ca. 180,000 is water. This is somewhat greater than that of the United States (including Alaska but not the insular possessions) and a little less than that of Europe.

So far as physical features are concerned, the Canadian half of the continent may be divided into four regions: (1) In the east, and including the larger part of the Maritime Provinces, the hills and lowlands are a continuation of the Appalachian Highlands. (2) Westward, and covering an immense portion of the country, is the Laurentian region, in-

cluding the provinces of Quebec and Ontario and the eastern part of Manitoba, as well as the land north of these provinces. (3) Next comes the great unwooded plain of Western Manitoba, Southern Saskatchewan, and Southern Alberta, extending to the base of the Rocky Mountains. (4) British Columbia forms the fourth and last division, a veritable 'sea of mountains,' running parallel to the coast and enclosing many fertile valleys.

The highest peaks in Canada are Mount Logan (19,539 ft.), and Mount Lucania (17,147 ft.), in the Yukon District, and Mount Fairweather (15,292 ft.), in British Columbia.

Canada is drained by four river systems: (1) The Atlantic, including the St. John River in New Brunswick and the St. Lawrence River, with its tributaries. The St. Lawrence River and the Great Lakes form a vast navigable waterway, extending from the Gulf of St. Lawrence into the heart of the continent. (2) The Hudson Bay system includes the Nelson, Albany, and Churchill Rivers, as well as the Saskatchewan, which, rising in the foothills of the Rockies, eventually discharges its waters into Hudson Bay through the Nelson. (3) The Athabasca and Peace Rivers flow into Lake Athabasca, which discharges its surplus waters into the Great Slave Lake, under the name of the Slave River. The Mackenzie River flows from the Great Slave Lake into the Arctic Ocean. These, with other rivers, are included in the Arctic system. (4) The Pacific system includes the Fraser, Thompson, and Columbia Rivers, all flowing into the Pacific Ocean.

Along the Pacific Coast the Japanese current greatly modifies the extremes one would naturally look for in a continental province north of the forty-ninth parallel of north latitude. East of the Rocky Mountains we find such extremes of temperature as are generally to be expected in the same latitudes of the North Temperate zone.

A large part of the Maritime Provinces has a climate and soil well adapted to raising all kinds of cereal, horticultural, and root crops. In Nova Scotia the most fertile parts are the Annapolis and Cornwallis valleys and the counties of Cumberland, Colchester, and Antigonish. In New Brunswick the valleys of the St. John and the Kennebecasis are the gardens of the province; while by far the larger part of Prince Edward Island is extremely fertile. In Quebec, the Eastern townships and the valley of the St. Lawrence contain the best and most fertile land in the prov-

ince. The peninsular part of Ontario is the most desirable portion of that province, from an agricultural and horticultural point of view. Peaches and grapes are grown there in large quantities. Farther west, in the Prairie Provinces, the virgin land is of unexcelled fertility; and this is true, to a less extent, as far north as the wooded portions of these provinces; while the Peace River country, in Northwestern Alberta, is particularly suitable for mixed farming. In British Columbia, the valleys in the interior and a large part of the sea coast are the choicest portions.

*Geology.*—Geologically, Canada may be divided into six great provinces. Of these, the most extensive is the great Laurentian Plateau. This great plateau is occupied by rocks of pre-Cambrian age, and belongs to the oldest of the world's systems of strata. Much of the southern portion has been discovered to be rich in valuable metals and minerals. It is highly probable that the more inaccessible parts may yet yield a rich return to the miner.

The flora of all the northern part of Canada is Arctic and sub-Arctic and that of the St. Lawrence and Maritime Provinces differs little from that of the Northeastern United States.

Moose and caribou are found in all the provinces save Prince Edward Island. Bears and wolves are found in much smaller numbers. In summer numerous varieties of song birds are found everywhere. So also are geese, ducks, teal, partridges, and woodcocks, and in the prairies the so-called prairie chicken.

Canada's forests are a great source of wealth and it is estimated that between 300,000,000 and 400,000,000 acres contain timber of commercial size. The most important Canadian wood is spruce.

The lumbering industry in Canada is a most important one, ranking second among the natural industries. Canada is the largest producer of newsprint paper in the world.

Canadian fisheries, which are carried on over an area of 200,000 square miles in the Atlantic, 20,000 square miles in the Pacific, and 140,000 square miles of inland waters, are under the control of the Dominion Government, although each province has proprietary rights within its own jurisdiction. British Columbia and Nova Scotia are the leading fishing provinces. The salmon, cod, lobster, halibut, herring, mackerel, and whitefish fisheries are the most important.

A treaty was signed by Great Britain and the United States in 1908 for the purpose of

providing uniform and effective regulations for the protection, preservation, and propagation of food fishes in waters contiguous to the international boundary between the United States and Canada. An International Fisheries Commission, composed of an American and a Canadian, was appointed in accordance with a provision of this treaty, for the purpose of preparing regulations in connection therewith.

All of the six geological provinces of Canada, not even excepting the Arctic region, contribute to the mineral production of the Dominion. In the Appalachian region coal is by far the most important non-metallic mineral. Next comes asbestos, found in the Eastern Townships of Quebec. Gypsum occurs in many places in the Maritime Provinces, and gold and copper are produced.

In that portion of the St. Lawrence region commonly known as the peninsular part of Ontario, petroleum and natural gas are present in large quantities. Gypsum also is mined to some extent.

The southern part of the Laurentian region is noted as a producer of gold. This region also produces considerable quantities of silver. Large and productive nickel mines are found near Sudbury. This is also a famous copper-producing district.

The interior Prairie region closely resembles the St. Lawrence region both in its geological formation and the minerals it contains. This is subject, however, to one important exception, for the Prairie region contains large deposits of coal and lignite.

In the Cordilleran region, embracing Western Alberta and all of British Columbia, coal is the leading mineral product.

In the Arctic region, high grade native silver and other silver-bearing minerals have been discovered.

The mining industry is third in importance among the primary industries of Canada, being surpassed only by the basic industries of agriculture and forestry. Canada's known mineral resources include about every variety of mineral, many of the deposits being sufficiently extensive or rich to render them of world importance. This is especially true of its deposits of nickel, asbestos, cobalt, and gold.

Agriculture is the leading industry in Canada, not only in the Prairie Provinces of the middle west, but also in the older provinces of the east; while the value of the agricultural products is greater than of any other industry, excepting the net product of man

ufactured commodities. In a general way the agricultural belt extends across the continent north of the American border, a belt 2,500 miles long and several hundred miles wide, but not all of this vast area is suitable for cultivation.

Though an increasing tendency toward mixed farming is observable in Manitoba, the farmers of the Prairie Provinces still devote most of their attention to the growth of wheat. In British Columbia, several fertile valleys have a world reputation for the size and color of their apples.

Dairy farming from the time of the early settlers has occupied a prominent place among Canadian industries. Cattle were introduced by the very first settlers and butter and cheese were among the first manufactured home products, at first for local consumption, but in the course of time for the export trade. Dairy farming is carried on in all parts of the Dominion, and Canadian cheese, made to a large extent in coöperative factories, has attained an excellent reputation in the English and other markets.

Over two-thirds of the field-crop acreage of the Dominion is in the Prairie Provinces, and the greater portion of this area is planted to the grain crops, with wheat far in the lead.

Although the growing of grain-crops has overshadowed the raising of live stock the latter industry has shown a steady, substantial growth not only from the standpoint of numbers but especially in the improvement of foundation stock. The distinctive ranching country of Canada is in Southern Alberta and Southwestern Saskatchewan. Dairy farming is typical of Eastern Canada since this region is tributary to the populous Canadian and American centres demanding milk and cream and convenient to the overseas markets for cheese and butter. The demands of the American Middle West for cattle and of the Pacific Coast for hogs have influenced the kind of live stock production in the West.

Canadian ocean shipping dates back to the early European fishermen who frequented the shores of Newfoundland and the Maritime Provinces.

In the days of fast wooden sailing vessels, Canadian shipping held an important position among the maritime nations of the world, and also at a later date when steam power first came into use. The war in Europe stimulated shipbuilding and there was a temporary activity assisted by the marine program of the Dominion Government. At

the present time, the amount of tonnage owned is relatively small.

Prior to the period of extensive railway construction which began for Canada in the 1850's, the water routes, more especially the St. Lawrence, the Great Lakes and the Ottawa, were the chief avenues of transportation. These routes were interrupted at certain points by falls and rapids, necessitating portages. The canals of Canada were constructed to eliminate the toil of unloading, transporting and reloading at the portages. The earliest mention of canals in Canada is in connection with the Lachine Canal, begun by French settlers in 1700, but only after the conquest of Canada by the British were improvements of the main water routes made, and in the early part of the 19th century increased internal and foreign trade and the introduction of steam navigation resulted in more attention being given to this work. The canals of the Dominion still have an important place in the transportation system of the country. They are owned and operated by the Dominion Government in connection with navigable lakes and rivers. According to their geographical position, they naturally comprise seven main systems:

The first and most important is that which has been constructed primarily for the purpose of affording a navigable water route between Lake Superior and Montreal, at the head of ocean navigation. This series of canals has a total length of 74.99 miles, and comprises from west to east the following, in the order named: The Sault Ste. Marie, between Lake Superior and Lake Huron (dimension of lock, 900 x 60 ft.; depth of water at lowest known water level, 19 ft.); the Welland Canal, between Lakes Erie and Ontario; the new Welland Canal, officially opened April 20, 1931, is one of the great engineering feats of the world. The total length of the Welland Canal is 27.7 m. and the estimated time required for a vessel to pass through it is eight hours. There are seven lift locks and one guard lock, which overcome a total drop of 326.5 ft. from Lake Erie to Lake Ontario.

The second system comprises the Grenville, Carillon, and Ste. Anne's Canals, having a combined length of 7 m., and affording, in conjunction with the Ottawa River, a means of water transportation between the city of Ottawa and the St. Lawrence River.

The third system comprises the Chambly and St. Ours' Canals, which make it possible

for boats to pass from Sorel, at the mouth of the Richelieu River, to Lake Champlain.

The fourth series of canals is included in what is known as the Rideau Navigation system, which connects the Ottawa River at the city of Ottawa with the eastern end of Lake Ontario at Kingston, a distance of 126.25 m., a large part of which is a river waterway.

The fifth system, known as the Trent, comprises a chain of rivers and lakes extending from Trenton, at the mouth of the Trent River, on the Bay of Quinte, Lake Ontario, to Lake Huron, a distance of about 238 m., of which about 20 m. are canals.

St. Peter's Canal, forming the sixth system, connects St. Peter's Bay, on the south side of Cape Breton Island, Nova Scotia, with Bras d'Or Lake.

The seventh system comprises the St. Andrews waterway from Winnipeg to Lake Winnipeg on the Red River.

The completion of the new Welland Canal has opened Lake Ontario to grain carriers of the Upper Lakes. On Nov. 16, 1931, the Dominion Government began negotiations at Washington, D. C., with the Government of the United States for the construction of the St. Lawrence Seaway. This project involves the construction of canal and locks on the international section of the St. Lawrence River and also on the Quebec portion of the river above Montreal to allow sea-going vessels to pass in and out of the Great Lakes. An agreement was reached with the United States on this project in 1941.

Canada's first railway was constructed in 1836, but the railway era there may be said to have begun in 1851, when an Act was passed providing for the construction of a main line of railway between the two Canadas. The result was the inauguration of the Grand Trunk system between Montreal and Toronto and several subsidiary lines throughout Ontario and Quebec.

The Canadian Pacific Railway Company, the first to be constructed of the three great Canadian railway systems which now connect the Atlantic with the Pacific Ocean owns and operates more than one-third of the railway mileage of Canada. The company also owns a large fleet of steamers by means of which communication is maintained between Montreal and Europe and between Vancouver and the Orient, and has several ships engaged in the coasting trade on the Pacific, as well as on the Great Lakes during the navigation season.

The National Transcontinental has been of

considerable value as a colonization road in Northern Ontario and Quebec, and is now being operated as a part of the Canadian National Railways.

The Grand Trunk Pacific was taken over by the Government under receivership on Mar. 10, 1919, and has been operated as a part of the Canadian National Railways since October, 1920.

The Grand Trunk Railway is the oldest of all the great Canadian railway systems. It was chartered in 1852, and was financed by English capital. The Grand Trunk is now included in the Canadian National system.

The Canadian Northern Railway, Canada's third transcontinental line, completed its system from ocean to ocean, and operated trains between Quebec and Montreal in the East, and Winnipeg, Edmonton, and Vancouver in the West. This railway has also been incorporated with the Canadian National system.

A postal service was established between Montreal and Quebec as early as 1721, official messengers and other travelers making a practice of carrying letters for private persons. When Canada came under British rule the Post Office was placed on a settled footing by Benjamin Franklin, then Deputy Postmaster-General for the American colonies, who visited Canada in 1763, opened post offices at Quebec, Montreal and Three Rivers, and also established courier communication between Montreal and New York. The Post Office is now under the direction of a special department, administered by the Postmaster-General. The Dominion is divided into 15 districts which in their entirety embrace a territory more extensive than that served by any other system in the world except those of the United States and Russia.

Canada is richly endowed with water power resources and is in the forefront as regards their utilization. In fact, practically every large industrial centre throughout the Dominion is now served by hydroelectric energy and has within practical transmission distance substantial reserves for the future.

One of the factors in the progress of Canada is the possession of many natural resources favorable to industrial growth. It is upon the country's agricultural resources, forests, minerals and wild life that Canada's industries are mainly based. The sea and lake fisheries also make an important contribution of raw materials to the manufacturing industries of the Dominion. Nevertheless, the industrial development of Canada was a mat-

ter of small beginnings and gradual growth over a period of many years, and the comparatively small home market, restricted even at present to a population of 11,500,000, a large part of it in scattered agricultural areas, is still one of the difficulties of the situation. Yet Canada is now not merely the second largest manufacturing country in the British Empire; her exports to the other Dominions consist largely of manufactured goods.

The seven leading industries are pulp and paper-making, slaughtering and meat-packing, the milling of grain, the generation and distribution of electricity, sawmilling, the manufacture of automobiles, and of butter and cheese. The leading centres of manufactures are Montreal and Toronto. After these come Hamilton, Winnipeg, Vancouver, and Oshawa. Electric light and power plants have a greater invested capital than any other industry, with pulp and paper mills and sawmills next in order.

The external trade of Canada has increased enormously since the beginning of the War in Europe. Within a decade Canada has become the fifth greatest trading nation in the world, following the United States, the United Kingdom, Germany and France.

Canada leads the world in exports of wheat, newsprint, nickel and asbestos. It stands high also in exports of automobiles, wheat, flour, wood pulp and rubber tires.

The existing customs regulations in Canada provide for three different rates of duties, the preferential tariff, the intermediate tariff, and the general tariff. In addition, a special 'dumping' duty and a surtax may be imposed.

The preferential tariff applies to goods produced or manufactured in the United Kingdom, British India, and most of the British colonies when imported direct from any British country. This tariff went into operation on Aug. 1, 1898.

The intermediate tariff may be applied by Order-in-Council to the products of any British or foreign country. The duties there set forth are slightly lower than those of the general tariff.

The general tariff applies to the imports from all countries not entitled to the preferential or intermediate tariff. It is decidedly protective in its nature.

The special or 'dumping' duty is an additional tax which may be levied upon goods sold to a Canadian importer at a price lower than the market price in the country whence

they are exported to Canada. This tax may not exceed 15 per cent. ad valorem.

By the British North America Act the Dominion Government was given the right to deal with the public debt and property; the right to raise money by any system of taxation (the provinces were limited to direct taxation), and the borrowing of money on the credit of the Dominion. At Confederation the revenues, notably the customs and excise duties which had previously accrued to the provinces, were transferred to the Dominion and combined into a consolidated revenue fund against which certain fixed charges such as the cost of collection, interest on the public debt, and salary of the Governor-General were made. The remainder of the fund was appropriated by Parliament. The public works, cash assets and other property of the provinces, except lands, mines, minerals and royalties also became Dominion property. In turn the Dominion assumed responsibility for the debts of the provinces. Since the main sources of provincial revenues were now taken over, the Dominion was to pay annual subsidies to the provinces for the support of their governments. As the Dominion grew westward, this principle of subsidy payments was extended to the Western provinces.

The area of the Dominion, as revised on the basis of the results of exploration in the north, the area taken from Quebec by the Labrador Boundary Award of 1927, and the adjustments made in the area of Ontario in 1930, is 3,845,144 sq. m., including 180,035 sq. m. of water. The first census taken in Canada was that of the little colony of New France in 1666 and showed a population of 3,215. By the time of the conquest, nearly a century later, this had increased to 70,000 and the Maritime Provinces had another 20,000. Soon after the conquest, Loyalists flocked to Canada and by 1800 it was estimated that Canada had a population of between 250,000 and 260,000. Within the present century there has taken place a spectacular expansion of the population.

The 1951 population of the principal cities and towns is as follows: Montreal, 1,021,520; Toronto, 675,754; Vancouver, 344,833; Winnipeg, 235,710; Hamilton, 208,321; Ottawa, the capital, 202,045; Quebec, 164,016; Halifax, 162,217; Edmonton, 159,631; Calgary, 129,060; London, 95,343; Regina, 71,319; Windsor, 62,957; St. John, N. B., 50,779; Saskatoon, 53,268; Victoria, 51,331. The total population of Canada was in 1951, 14,009,429.

Largely as a result of the opening up of virgin wheat land in the provinces of Manitoba, Saskatchewan, and Alberta, there has been a marked influx of population into Western Canada since the beginning of the century. The great fertility and productivity of this new country have attracted many farmers and farm laborers from the American West and the United Kingdom. There were also before the war many arrivals from Eastern Europe, largely attracted by the demand for railway 'navvies' and miners. However, the English-speaking element largely outnumbers those of other nationalities, and the educational authorities are actively at work in 'Canadianizing' the children of the continental Europeans.

English is spoken or understood almost everywhere, except in the rural parts of Quebec, where French alone is understood by many of the *habitants*. French is also spoken in parts of Eastern Ontario, where the French-Canadians have settled, and in a few small communities in the West. The English-speaking people of most of the Eastern townships in Quebec are being supplanted by French-speaking Canadians. French and English are official languages both in the Dominion Parliament and in the Quebec legislature. In the latter French is commonly used to the exclusion of English, but in the Dominion Parliament even the French-Canadians generally prefer to speak English.

Canada's free educational system is in the hands of the provinces, except for the task of instructing the Indians who are the wards of the Dominion Government, and except in so far as the British North America Act secures the permanence of the denominational schools which existed at the time of Confederation. Six of the provinces have provincial universities, and the remaining three have certain colleges belonging to the higher educational system.

With the exception of Quebec all the provinces have laws of compulsory education, but under differing conditions.

Canada has 152 institutions which provide higher educational facilities. About 60 of these offer only arts courses, 35 are theological colleges, and 15 others confine their instruction to one line of professional training such as agriculture or engineering. Some of these grant degrees but the majority are affiliated to one of the 18 universities which grant more than 95 per cent. of all degrees. For statistics of education in Canada see

statistical pages. (See EDUCATION IN CANADA and the articles on the separate provinces.)

Canada is organized in 11 military districts, each under a commander and his district staff. The militia is classified as active and reserve, and the active is subdivided into permanent and non-permanent forces.

The Royal Canadian Mounted Police is a Dominion force, for use in any part of Canada, organized in twelve divisions under a Commissioner. Its headquarters is at Ottawa and the training depot at Regina, Saskatchewan.

An act entitled 'An Act Respecting the Naval Service of Canada' was passed by the Canadian Parliament in 1910. This Act provided for the creation of a naval force to consist ultimately of 11 ships.

The constitution of Canada is of a federal character, all powers not specifically granted to the provinces being exercised by the Dominion Government. Briefly, it is the British Constitution federalized.

The executive authority of the Federal Parliament is vested in the King, and is carried on in his name by a Governor-General and Executive Council or Cabinet, consisting of the outstanding members of the political party having a majority of the House of Commons, and bound to give place to others as soon as they cease to command the support of a majority of the House of Commons. The Governor-General, who is appointed by the King, has the right to disallow or reserve bills passed by Parliament—a power which has only once since Confederation been exercised, and then in a purely technical matter.

The legislative authority is exercised by a Parliament of two houses, the Senate and the House of Commons. The members of the Senate are appointed by the Governor-General-in-Council and hold office for life. Their total number is 96. The Senate has relatively little power or influence, and does not initiate, amend, or refuse its consent to money bills. The House of Commons is composed of 245 members, chosen by what is practically adult suffrage. Both Senators and members of Parliament receive \$4,000 per full session. The Government has the power to disallow any act passed by a provincial legislature, though this again has rarely been exercised. There is no recent instance of the disallowance of provincial legislation. The Federal Parliament is quinquennial, unless sooner dissolved, and sits at Ottawa (q.v.), the capital.



Each of the nine provinces of Canada has a separate legislature, with a Lieutenant-Governor appointed by the Governor-General-in-Council and holding office for five years.

The Northwest Territories (q.v.) are governed by a Commissioner and Council of four members, appointed by the Governor-General-in-Council. The Yukon territory is governed by a Commission appointed by the Governor-General-in-Council, and an Executive Council of 10 members elected by the people.

The Judiciary includes a Supreme Court in Ottawa, having appellate, civil, and criminal jurisdiction over the whole Dominion; an Exchequer Court; a Superior Court in each province; and County Courts—the members of all these courts being appointed for life by the Governor-General-in-Council. In certain cases there is an appeal from Canadian Courts to the Judicial Committee of the Privy Council sitting in London. There being no state church in Canada, priority among the denominations is determined by numbers only. The Roman Catholic church has a privileged position in Quebec, with the legal right to collect tithes from all her members.

In 1534 Jacques Cartier landed on the Gaspé coast of Quebec, of which he took possession in the name of Francis I., king of France. However, nothing was done toward the permanent occupation and settlement of Quebec till 1608, when Samuel de Champlain, who had visited the country in 1603 and in 1604, founded the city. In the meantime (1604-5), French settlements were made in what are now the Maritime Provinces, but known to the French as Acadia (q.v.), where De Monts established a permanent agricultural population at Port Royal (now Annapolis Royal). France claimed, as a result of this settlement, exclusive control of the whole region from Acadia west to Lake Superior, and down the Mississippi to the Gulf of Mexico.

The control of this region was contested by England, who claimed part of it through right of prior discovery. In 1670 a charter was granted by Charles II. to Prince Rupert to found the Hudson's Bay Company, with exclusive rights of trading in the Hudson Bay basin. A long struggle was carried on between England and France for the control of the North American Continent, which ended in the cession of Acadia, Newfoundland and the Hudson Bay Territory by the Treaty of

Utrecht in 1713, and the cession of Canada by the Treaty of Paris in 1763. Of all its Canadian territory, France retains only the islands of St. Pierre and Miquelon, off the coast of Newfoundland. The French shore rights, which were for long a cause of friction, in the end were renounced by France under the Anglo-French convention of 1904.

During the War of American Independence Canada was invaded by the Americans, and the end of the war saw a great influx of loyalists from the United States, and the formation of the province of New Brunswick (previously part of Nova Scotia). The treaty of peace in 1783 took away from Canada territory now included in Minnesota, Michigan, Ohio, Indiana, Illinois, and Wisconsin.

By the Treaty of Paris (1763) the French in Quebec received the guarantee of the free exercise of their religion. This guarantee was continued by the Quebec Act of 1774, and in addition the old French civil law was declared binding, while the criminal law was superseded by that of England. During the period from 1763 to 1791 Canada was ruled by the despotic regime established at Quebec—satisfactory neither to the French nor to the increasing English population in the present province of Ontario. As a result, Upper Canada, which was English in population and sentiment, was separated from Lower Canada in 1791, and an elected assembly was granted to each.

For a time the War of 1812 united both sides in loyalty to the Crown; but on the conclusion of peace, in 1814, matters began rapidly to reach a crisis.

Discontent resulted in rebellion in both provinces (1837-8)—a rebellion which was primarily a protest against an irresponsible executive. Lord Durham, sent over by England with authority to crush the insurrection, reported in favor of responsible government, which was granted in 1841, when the two provinces were again united. The English element in the united province as a rule divided on party lines, while the French presented a combined and solid front to the common enemy, and were thus enabled to hold the balance of power. Deadlock followed deadlock. The union of the various colonies under a federal form of government was proposed as the solution of a difficult problem, and in 1867 Canada, Nova Scotia, and New Brunswick united to form the Dominion of Canada.

The essential features of Canadian history since 1867 have been the consolidation of the

constituent elements of the Confederation, and its expansion to include those provinces and territories not under its control in 1867.

Considerable friction resulted in connection with the interpretation of the sections of that treaty and the power of the colonies to impose regulations upon American fishermen. After fruitless negotiations the question was settled by the award of The Hague Court (1910), on the points in dispute. See ATLANTIC FISHERIES ARBITRATION. In 1893 the Bering Sea Dispute was settled, and in 1903 the disputed question relative to the boundary between Alaska and Canada was decided by the commission appointed for that purpose. See ALASKA BOUNDARY DISPUTE.

When war was declared between Great Britain and Germany, Conservatives and Liberals united in a declaration of loyalty to the Empire, while Sir Wilfrid Laurier pledged the support of his party to an active participation in the Government's efforts to aid the mother country and her allies.

During 1918 the Union Government vigorously carried on its policy of bending all the resources of the country to the prosecution of war, in this being enthusiastically supported by the great majority of the population. At the end of the war the Government claimed for Canada, which had spent some \$2,000,000,000 and sacrificed some 60,000 lives in the struggle, a voice in the terms of peace. This claim was conceded to Canada and the other Dominions (Australia, New Zealand and South Africa), as well as to India, so far as the Empire was concerned, and the claim was made good at the Peace Conference in Paris (q.v.), the Dominions securing effective representation, taking no inconsiderable part in the Conference, and finally signing the Treaty of Versailles. As a natural result they became in their own right members of the resulting League of Nations (q.v.), with their own representatives on its Council and Assembly. Thus, without any violent break with the past, Canada has secured through the League of Nations a voice in international affairs at least as powerful as Argentina or Brazil.

The Dominion gained increasing recognition for its status in the world by being represented (1922) at the International Economic Conference at Genoa and nearer home at the conference in Washington on the perpetuation of the Rush-Bagot treaty of 1818 keeping warships off the Great Lakes.

In 1926 Premier King sailed for London to attend the historic Imperial Conference, from which a new status for Canada as well as other British Dominions emerged. Such powers as were formerly exercised by the British Governor-General in Canada were abrogated and his function confined to *'holding in all essential respects the same position in relation to the administration of public affairs in a Dominion as is held by his Majesty the King in Great Britain, and he is not a representative or agent of his Majesty's Government or any department of that Government.'* Furthermore, Canada and the other Dominions were declared to be *'autonomous Communities within the British Empire, in no way subordinate one to another in any phase of their domestic or external affairs, though united by a common allegiance to the Crown, and freely associated as members of the British Commonwealth of Nations.'* Thus official communication between Canada and the British Government was placed on the same footing as between independent states. A British High Commissioner (Sir William H. Clark) was sent to Canada in 1926, while a similar Canadian representative (Mr. Peter Larkin) was sent to London. In the same year diplomatic representatives ('ministers') were exchanged between Canada and United States. In 1929 Canadian legations were opened at Paris and Tokyo.

In 1927, Canada celebrated the sixtieth anniversary of Confederation. The Prince of Wales and Prince George, together with Mr. Stanley Baldwin, then British Prime Minister, visited Canada and were enthusiastically received, among the ceremonies in which they took part being the opening of the International Peace Bridge, connecting Fort Erie, Ontario, with Buffalo, N. Y. On Armistice Day (Nov. 11, 1929), the new Ambassador Bridge was formally opened, linking Detroit with Canadian territory at Sandwich, Ontario, across the Detroit River. The structure cost about \$22,500,000.

General Viscount Byng was succeeded by Viscount Willingdon as Governor-General of Canada in October, 1926. Lord Willingdon on Dec. 20, 1930, was appointed Viceroy of India. Lord Willingdon was the fifth Canadian governor-general to receive the vice-royalty of India, perhaps the most onerous position under the British crown.

In February, 1931, a new Governor-General of Canada was appointed, Vere Bra-

bazon Ponsonby, ninth Earl of Bessborough, born Oct. 27, 1880. He succeeded to the earldom in 1920; until then he was known as Viscount Duncannon.

He was succeeded on November 2, 1935, by the Rt. Hon. John Buchan, Lord Tweedsmuir, born August 26, 1876, who was already well known as a novelist and man of letters. The Prime Minister of the Liberal cabinet taking office October 23, 1935, was W. L. Mackenzie King.

On July 31, 1936, President Franklin D. Roosevelt, who was spending a vacation at his mother's summer home on Campobello Island, New Brunswick, visited Lord Tweedsmuir, Governor General, and Prime Minister Mackenzie King at Quebec to cement his good neighbor policy. Lord Tweedsmuir died in 1940 and was succeeded by the Earl of Athlone. Canada celebrated the 70th anniversary of the Confederation in July, 1937.

In 1939, King George VI. and Queen Elizabeth visited and traversed Canada from the Atlantic to the Pacific. This eventful trip marked the first visit of a reigning British sovereign to North America.

The Canadian Parliament declared war on Nazi Germany, Sept. 10, 1939; on Italy, June 10, 1940; on Japan, Rumania, Hungary, and Finland, Dec. 7, 1941. Canada supplied and armed its own fighting men; sent increasing quantities of food, arms, munitions, and equipment to its Allies, building up virtually from scratch a vast war industry; and sent troops and planes to assist U. S. forces in the defence of Alaska. An agreement between Canada and the U. S. for postwar political and economic collaboration was made Nov. 30, 1942. Nov. 1943, Canada appointed a full ambassador to the United States, thus heralding her assumption of full sovereign statehood.

Gov. Gen. apptd. 1946 to succeed Earl of Athlone: Sir Harold Alexander. Prime Minister (1951): Louis Stephen St. Laurent.

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Among recent books are Chamberlain's *Canada, Today and Tomorrow* (1942); Burt's *A Short History of Canada for Americans* (1942); and Burpee's *Discovery of Canada* (1946).

**Canada Balsam**, a kind of turpentine obtained from the balsam fir (*Abies* or *Pinus balsamea*), a native of Canada and the northern parts of the United States (see FIR). It exists in vesicles between the bark and the wood, and is obtained by making incisions. Canada balsam is valued in the arts for a variety of purposes—as an ingredient in varnishes, in mounting objects for the microscope, and in photography. By opticians it is used as a cement.

**Canada Company**, a company organized in 1825 by John Galt, the Scottish novelist, who became its Canadian superintendent. Lands were purchased in the western peninsula of Ontario, the town of Guelph was laid out, large tracts of land were cleared, and hundreds of the best class of English and Scottish settlers were established. It played a large part in the opening up and settlement of Ontario.

**Canada, Literature of.** See **English Literature, Canadian.**

**Canada, United Church of**, formed by the union of the Congregational Churches of Canada, the Methodist Church, the Presbyterian Church in Canada, and the Local Union Churches in Western Canada, themselves each the product of a series of unions. It was the culmination of a definite historical movement which arose (1) from the spiritual desire for the reunion of Christendom, (2) from the practical needs of a rapidly growing country whose population was scattered. The movement towards inter-denominational union began in 1885 and took definite shape in 1902, when the Methodist proposal for organic union of the Presbyterians, Methodists, and Congregationalists was taken up by each. During the war controversy was dropped and by unanimous agreement Local Union Churches were formed in the West. In 1921 the necessary legislation was prepared, approved by the courts of the three negotiating churches and

subsequently passed by the Provincial Legislatures and the Dominion Parliament. The total membership of the United Church of Canada is approximately 2,016,897.

**Canadian Northern Railway.** See **Canada: Railways.**

**Canadian Pacific Railway.** See **Canada: Railways.**

**Canadian Pondweed**, a dark green perennial plant (*Anacharis alsinastrum*), of the natural order Hydrochardeæ, with long, slender, branched stems, and small, sessile, linear-oblong leaves.

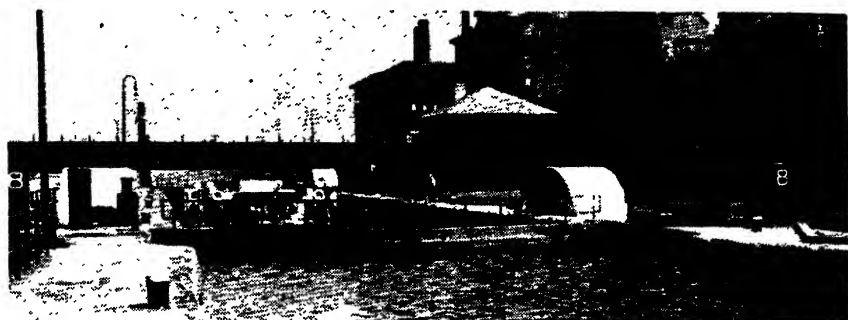
**Canadian River**, a tributary of the Arkansas River in the United States, rises in the northeastern part of New Mexico, and flows s. and e. for about 900 m. across the Panhandle of Texas and Oklahoma.

He studied under his uncle, Antonio Canaletto whom all his life he imitated both in tone and treatment.

**Canal, Grand.** See **Grand Canal.**

**Canal, Irrigation**, a canal whose object is to lead the waters of a river, flowing through a dry country, on to lands at a distance from the river bank, and so increase their fertility. Sluices and weirs for regulating the supply are constructed at the intakes of these canals, and arrangements are provided for the admission of the water into the branch canals and trenches which distribute the water over the area to be irrigated. See **IRRIGATION.**

**Canal, Navigation**, a level still-water channel solely constructed as a waterway. These canals may be classified under two divisions: ordinary inland navigation canals,



Photo, NYSPIX—Commerce

Oswego Lock of the N.Y. State Barge Canal.

**Canadum**, a metal of the platinum group, discovered in 1911 by A. G. French in the Kootenay ores of Canada.

**Canal**, an artificial channel filled with water. Though the name generally denotes a channel used for navigation, it is also applied to channels made for drainage and irrigation.

**Canal, Drainage**, an artificial watercourse formed to supplement rivers, where, owing to a deficiency of fall and the low level of the adjacent lands, they are inadequate for the discharge of the surplus rainfall in wet seasons, and the lands are exposed to floods. See **DRAINAGE.**

**Canaljas y Mendes, José** (1850-1912), Spanish statesman, was born in Ferrol.

**Canaletto, Antonio** (1697-1768), properly ANTONIO CANALE, the great architectural painter of Venice.

**Canaletto, Bernardo Bellotto**, called CANALETTO THE YOUNGER (1724-80), Italian painter and engraver, was born in Venice.

admitting smaller craft, known as Barge Canals, and Ship Canals, providing a means of less expensive transportation between ocean and ocean, or between the ocean and some inland center. In building canals the following two main points must be determined on: the cross section of the canal; the longitudinal profile.

Canals usually consist of a number of different sections or reaches, each on one level but differing from each other in height. By means of locks, inclines, or lifts, boats are transferred from one level to another.

The **Lock**, placed at the termination of the lower level, is a water-tight enclosure of masonry of sufficient dimensions to contain the largest barges or vessels that navigate the canal. Each end is closed by heavy swinging gates, which open in the middle against the direction of the current. Sluices, which are controlled from above, are inserted in the gates near the bottom, and when opened al-

low the passage of water, though the gates remain shut. When a boat, in ascending a canal, arrives at a lock, the upper gates are first closed, then the lower ones opened to allow the boat to enter, and when it has entered are closed behind it. Water is allowed to flow through the sluices in the upper gates, and sometimes also a side culvert discharges from the upper level into the lock. As the lock fills the water level rises to that of the upper reach; whereupon the upper gates can be opened, so that the boat can pass out of the lock on the higher level. The lift of a single lock ranges from 2 to 12 ft., and is commonly 8 or 9 ft.

Occasionally, where water is scarce, and the lift large, vessels are conveyed on an incline from one reach to the next, in a special carriage running on rails laid on the incline, and controlled by a cable. The lift or elevator (inclined or vertical) is also employed on some canals. The vertical elevator, instead of a series of regular locks, may in many cases be useful, as in a few minutes it lifts the barge to the same height it would take hours to reach by means of regular locks. The great advantage of the canal was recognized in ancient times, and remains and accounts of old canals in Egypt, Babylonia, Persia, India, China, Greece, Italy, and other countries are numerous. The Grand Canal of China is world famous.

Among important canals of the Old World are the famous *Suez Canal*, connecting the Mediterranean and Red Seas; the *North Sea and Baltic Canal*, known as the Kaiser Wilhelm or Kiel Canal, which begins at the dockyard in Kiel, on the Baltic, and enters the Elbe near Brunsbüttel, 15 m. above the North Sea; and the *Teltow Canal*, beginning near Potsdam and ending in Berlin. The *Corinth Canal*, cutting through the Isthmus of Corinth, saves two days in the voyage from the Adriatic to the Aegean Sea. The *Kronstadt or Pontileff Canal*, 18½ m. long, connects Kronstadt with Leningrad. (See articles on SUEZ CANAL; KAISER WILHELM CANAL; CORINTH, ISTHMUS OF.)

Probably the earliest known canals in England were the Foss Dyke still navigable and Caer Dyke, in Lincolnshire, 11 and 40 m. long, constructed by the Romans, and improved in the 12th century; but the opening of the Aire and Calder Navigation, toward the close of the 17th century, was the first important step in inland navigation. Among the largest canals of Great Britain are the Gloucester and Berkeley Canal, from Sharpness

to Gloucester; 17 m.; the Aire and Calder Navigation, and the Caledonian Canal, with a depth of 17 ft., which crosses Scotland and affords a passage for vessels of 300 tons. In Canada the connection between the St. Lawrence and the Great Lakes of North America has been completed by canals between Lake Ontario and Montreal, and by the Welland Canal for avoiding the falls and rapids of Niagara. The Sault Ste. Marie ('Soo') Canal unites Lakes Superior and Huron. It is only 2 m. long, but boasts a larger tonnage of traffic than the Suez Canal. (See SAULT SAINT-MARIE.) It had long been a Canadian ideal to shorten the distance from Lake Superior to the sea. The Trent system of canals which connects Lake Ontario with Georgian Bay via Lake Simcoe, has been constructed with this object.

Construction of the St. Lawrence Seaway, under discussion bet. the U. S. and Canada for 30 yrs., was begun Aug. 1954. This involves canals and locks on the international section of the St. Lawrence and above Quebec to allow seagoing vessels to pass in and out of the Great Lakes. As early as 1750 a canal had been dug in Orange co., New York, by Lieutenant-Governor Colden, for the transportation of stones. Washington was the father of the scheme of a great interstate system of canals; and he was the first to develop and stimulate general interest in plans for connecting the Great Lakes with the Atlantic Ocean. The beginning of the Erie Canal was made by the Western Inland Navigation Lock Company, formed in 1792. This company finished 6 m. of canal around the rapids at Little Falls, navigable for small barges going to Lake Ontario. In 1803 all canals built by it were bought by New York State, and a greater plan of connecting New York City with Lake Erie was suggested. Under Clinton, as governor, the canal was opened from Buffalo to Albany, in November, 1825, with a total length of 352 m. With the opening of the Erie Canal the time of freightage was reduced from 20 days to 10 days, while the freight rate was reduced from \$100 a ton to \$3 a ton.

The *Chesapeake and Ohio Canal* was carried out for 186 m. as far as Cumberland, by 1850, at an outlay of \$11,375,000; but its completion to Pittsburgh on the Ohio, making a total distance of 341 m., has not yet been effected. The Illinois and Michigan Canal, which connects Lake Michigan with the Mississippi River, was opened in 1848. The Cape Cod Canal, from Barnstable Bay to

Buzzard's Bay, Mass., opened in 1914 is 8 m. long and cuts off 100 m., and the most dangerous portion of the passage between New York and Boston. (See CAPE COD CANAL.)

**PANAMA CANAL.**—The construction of a canal at the Isthmus of Panama, to connect the Atlantic with the Pacific Ocean, was begun by a French company in 1881. Work ceased in 1888, but was resumed in 1894 by a new company, and continued with a small force of workmen until the property was sold to the United States Government, which has completed a lock canal on original lines—by far the most important undertaking of its kind in the world, and the greatest engineering feat of history. For a complete account, see the article PANAMA CANAL. Consult Mack's *Land Divided* (1945).

**BIBLIOGRAPHY.**—Consult *Reports of International Congress on Navigation* (1902 and 1905); U. S. Bureau of Statistics, *Information in regard to the Suez Canal and Monograph on the Great Canals of the World* (1903); Hepburn's *Artificial Waterways and Commercial Development* (1909).

**Canal Zone,** a strip of land 47 m. long and 10 m. wide, extending 5 m. on either side of the Panama Canal, from the Atlantic to the Pacific Ocean. By treaty with Panama in 1903 the United States received, in return for a payment of \$10,000,000 and an annual rental of \$250,000 (gold currency; \$430,000, other currency) the perpetual right of occupation, together with full control for police, judicial, sanitary, and other purposes; excluding the cities Colon and Panama, in which, however, jurisdiction was granted in all matters relating to sanitation and quarantine. The most important result accomplished by the United States in the Canal Zone has been the sanitation of the country. Yellow fever, malaria and pneumonia, which decimated the French workmen, have either been stamped out or greatly reduced. This work was done chiefly under the direction of Colonel Gorgas, who had already done such valuable work in Cuba.

In January, 1914, an executive order of the President established the permanent government of the Canal Zone, effective April 1. The President's order provided for several departments or divisions, all under the direction of the Governor, who will report to the President through the Secretary of War by which the Canal Zone is to be governed and the Panama Canal operated. Col. George W. Goethals, the builder of the Panama Ca-

nal, was appointed the first governor. See PANAMA; PANAMA CANAL. Consult *Reports of the Isthmian Commission*; Frank's *Things as They Are in Panama* (1913).

**Canandaigua Lake** stretches n. and s. from Ontario to Yates co., New York, and is 660 ft. above sea level.

**Cañar,** a central province of Ecuador. Area, 1,570 sq. m.; p. 95,838. Numerous Inca remains are found. Its capital is Azogues.

**Cañar,** town in above province; 25 m. n. of Cuenca.

**Canara, India.** See **Kanara.**

**Canarium,** an Oriental genus of Amyridaceæ. *C. commune* is a native of the Moluccas, but introduced into many parts of tropical Asia. It is a tree about 50 ft. high; its fruit is a drupe, of which the kernel is eaten raw, roasted, or made into bread. The tree also yields a resin.

**Canary** (*Serinus canarius*), a species of passerine bird of the family Fringillidæ, or Finches. It is found wild in the Canary Islands, Madeira, and the Azores, and has been extensively domesticated in Europe and America, where it is common as a cage bird, and is much esteemed for its musical powers. In its wild state the canary measures about 5 inches, and is olive or apple green above, and golden yellow below with markings of brown on the head, rump, and flanks. The canary breeds readily in confinement. By careful selection and breeding the size has been increased, the color modified, and the powers of song cultivated. The canary not infrequently lives 15 or 16 years. Scientific breeding has produced a number of distinct varieties. The Belgian Canary is one of the most highly prized. Other varieties are the Cinnamon Canary, so called from its beautiful color; and the Roller Canary, a variety kept solely for its song, and trained with great care by means of a bird organ or by another highly trained bird called a 'school-master.' The finest singers come from the Harz Mountains. Hybrids, known as 'mules,' are often produced by crossing with other finches. The canaries seen in the United States are mainly importations of plain forms preferably pure yellow, from Germany, whence many thousands are brought annually. See CAGE BIRDS. Consult Wallace's *The Canary Book*; Robson's *Canaries, Hybrids, and British Birds in Cage and Aviary*.

**Canary Grass** (*Phalaris canariensis*), a grass of which the seed is much used, under the name of canary seed, as food for cage birds, and which is on that account cultiva-

ted in the s. of Europe, and in certain districts of Germany and England. It is largely grown for seed in Southern California. It reaches a height of 2 or 3 ft., with a spike-like panicle of one inch or more. The large Reed Canary Grass (*P. arundinacea*), common on river banks, is an abundant source of coarse fodder; and Southern Canary Grass (*P. caroliniana*), or Apache Timothy, is also valued for forage. A striped variety is cultivated as 'Gardeners' Garters,' 'Ribbon Grass' or 'Ladies' Traces.'

**Canary Islands**, a volcanic group of islands belonging to Spain, in the Atlantic Ocean, about 60 m. off the n.w. coast of Africa. The group includes seven large inhabited islands—Tenerife, Grand Canary (Gran Canaria), Palma, Lanzarote, Fuerteventura, Gomera, and Hierro (Ferro)—and a number of rocky islets, with a total area of 2,808 sq. m.

The islands are bold and picturesque in outline, and mountainous in character, the chief elevations being volcanoes, of which the highest, the Peak of Tenerife (q.v.), rises 12,180 ft. There are no rivers, and on several of the islands water is very scarce. The equable temperature and moderate rainfall make the islands an ideal health resort. The mean annual temperature is about 70° F.; the minimum 60° F., and the maximum 86° F. There are over 900 species of wild flowering plants on the islands, about 400 of which are peculiar to the group. Commerce is chiefly with Great Britain and Spain. The three main articles of export are bananas, tomatoes and potatoes. The principal seaports, Las Palmas, on Grand Canary, and Santa Cruz, on Tenerife, are important coaling stations, and are among the most frequented ports in the world.

Tenerife, Palma, Gomera and Hierro; the latter, Grand Canary, Lanzarote, and Fuerteventura. The official religion is Roman Catholic; p. 531,533, mostly Spanish. The Canary Islands were first taken possession of (1402) by a Norman, Jean de Bethencourt. The title later passed to the king of Spain, and after a struggle with the native inhabitants, the Gaunches, extending over the greater part of the 15th century, the Spaniards in 1495 made themselves masters of the whole archipelago. See separate articles on the principal islands. Consult F. du Cane's *The Canary Islands* (1911) and Lambert's *A Yankee Doctor in Paradise* (1941).

**Canary Seed.** See **Canary Grass**.

**Canary Wine**, or **Tenerife**, a dry white

wine, famous from the 16th to the middle of the 19th century. At the present time a Canary port and Canary sack are obtained from the s. of Spain.

**Canberra**, the capital of the Commonwealth of Australia, near the Cotter River; 150 m. s.w. of Sydney. Situated on two commanding hills, it occupies an area of about 12 sq. m. in the Federal Territory, a tract of 900 sq. m., ceded to the government by New South Wales in 1910. A strip of Federal Territory connects the capital with its port, on Jervis Bay, an almost completely landlocked harbor of sufficient size and depth to accommodate the entire British fleet.

The commission for city plans was awarded in 1912 to W. B. Griffin of Chicago, Ill., and in March, 1913, the work of building was begun. By deliberate design Canberra is to resemble in a general way the capital of the United States. Parliament met in Canberra for the first time in 1927; p. about 19,000.

**Canberra Agreement.** An agreement made between Australia and New Zealand, and signed Jan. 21, 1944, to effect a loose confederation of the two dominions for purposes of foreign policy.

**Canby, Edward Richard Sprigg** (1819-73), American officer, born in Kentucky; was killed near Siskiyou, Cal., by Modoc-Indians while in conference with their leader.

**Canby, William Marriott** (1831-1904), American botanist, was born in Philadelphia. He devoted much time to the collection of specimens of the flora of the United States and Canada.

**Cancan**, or **Chahut**, a dance somewhat of the nature of a quadrille, but characterized by high kicking and other suggestive movements.

**Cancao**, Cambodia. See **Hation**.

**Cancellation** (Latin *cancellare*, 'to make like lattice work,' 'to strike out by means of cross lines'), in Mathematics, signifies the elimination of a common factor in both numerator and denominator of a fraction.

**Cancelling of Deeds.** A legal document is said to be *cancelled* when its force is destroyed by some intentional act of the maker or other party having right thereto, or by the judgment of a court. A common form of cancellation is by striking out the signature, and also, if it be a deed under seal, by tearing off the seals. See **ALTERATION**.

**Cancellus.** See **Chancel**.

**Cancer**, or **Carcinoma**, is one of the two varieties of Malignant Tumor, the other being known as *Sarcoma*. The term **Cancer**

does not indicate a single distinct disease, like pleurisy or appendicitis, but is applied to a group, the members of which are similar in many respects, and quite different in others—especially as regards the degree of malignancy and the form of treatment. For all practical purposes, both carcinoma and sarcoma may be here considered under the heading of Cancer, as they are equally malignant.

Carcinoma may occur in the skin, mucous membrane, mouth, and intestinal canal, and in the stomach, uterus, heart, liver, and other organs. Particular emphasis is to be placed on the fact, now thoroughly established, that at its inception cancer is a local disease, restricted to a small area. If the new growth is not removed or destroyed, however, the cancer cells rapidly multiply, and invade the surrounding normal tissues; and sooner or later enter the blood or lymph vessels, and are borne with the current to adjacent lymph glands, and to other parts of the body, often at a considerable distance from the primary growth.

Unlike the benign tumors, which have a dense capsule of fibrous tissue, serving to confine the growth within definite limits and prevent invasion of the surrounding tissue, there is no capsule in malignant tumors, and consequently there is nothing to prevent the cells from invading the normal tissues in all directions. This explains why removal of a benign tumor is followed by complete recovery whereas in the case of a malignant tumor it is often impossible to go far enough into the tissues to extirpate the entire area invaded by the cancer cells. Cancer is well-nigh universal in geographic distribution, and no country or district of the globe is free from its ravages. Nor is the disease restricted to the human family, for it has been found extensively among other members of the animal kingdom, as cattle, horses, dogs, cats, birds, fish, molluscs, and reptiles. The essential cause of cancer is unknown, though many theories have been advanced to explain tumor formation. These may all be grouped under two general classifications: (1) those which assume the presence of some living organism or the theory of *parasitic origin*; (2) those which presume the cause is to be found within the body itself, or the theory of *biological origin*. A strong impetus was given to the parasitic theory in the summer of 1925 by the work of Dr. W. E. Gye and J. E. Barnard in Great Britain and by Dr. Peyton Rous, of the Rockefeller Institute. Contradictory views are also held regarding the influence of

heredity. Many cases are on record where cancer has appeared in several successive generations; but while heredity plays a *rôle*, it is believed to be not an important *rôle*.

An important advance has been the recognition of certain precancerous conditions, benign in every respect, but which at any time, as the result of irritation, may undergo a malignant change. Constant local irritation of any character is dangerous. Cancer is largely a disease of middle and advanced life, although it frequently appears in the young. Any lump, growth, chronic sore, or unusual discharge occurring after thirty-five years of age should be regarded with suspicion, and the advice of a competent surgeon sought at once. The absence of pain does not preclude the possibility of cancer, for pain is never a prominent symptom in the early stages. The rate of growth may be rapid or slow, depending on the variety. While the total number of recorded deaths from cancer increases year by year, this does not necessarily prove that there is a relative increase in mortality from cancer.

The high death rate for cancer could be greatly reduced by an early recognition of the disease, followed by prompt and thorough surgical removal. If the operation is performed before the lymphatic glands are involved, the chances of a cure are decidedly good. While there are methods of treatment that in some instances offer a degree of hope for the sufferer, the evidence from all sources points to the conclusion that surgery is the method of choice for practically all operable cancer.

Among non-operative methods of treatment employed at the present time may be mentioned the x-ray, radium, and other radio-active substances, oliguration, electro-thermic coagulation, desiccation, diathermy, and a large number of extracts and sera.

The movement for scientific cancer research in the United States was inaugurated in 1898, when the New York legislature made a small appropriation for equipping and maintaining a laboratory. The money was placed at the disposal of the University of Buffalo, where a laboratory was established, under the directorship of Prof. Roswell Park. This was taken over by the State in 1901, and has since been known as the New York State Board of Health. In 1899 the Cancer Commission of Harvard University was organized, under the terms of a gift of Caroline B. Croft; in 1903 the Collis P. Huntington Fund for Cancer Research was instituted; and in



1912 the George Crocker Special Research Fund was established at Columbia University. The name has now been changed to the Institute of Cancer Research, founded by George Crocker. Organized investigation into the nature of cancer, and what may be accomplished toward its cure or alleviation, has also been conducted by the Cancer Department of the Rockefeller Institute for Medical Research and a growing number of hospitals both in the United States and Europe. The International Association for Cancer Research was inaugurated at Heidelberg in 1906.

In 1900 cancer stood seventh in the list of causes of death. In 1937 it was second only to heart disease. Efforts have been made to educate the public to the necessity of early diagnosis and treatment. A new era of research began with the transplantation of cancer by grafting disease cells into small animals, as mice. Many methods of producing cancer experimentally in the laboratory and of cultivating cancer cells outside the body are known today. In 1946 Dr. Gregory Roskin of Russia experimented successfully with a serum and used mice in his tests. With the discovery of antibiotics and the invention of the electronic microscope a new field was entered. Radioactivity was also brought into use and radioactive phosphorus, an atomic research by-product, was successfully used in treating two types of skin cancer.

**Bibliography.**—Consult William S. Bainbridge's *The Cancer Problem* (1914); Publications of the American Society for the Control of Cancer, notably *Essential Facts about Cancer* (1924); and *What Every One Should Know about Cancer* (1924).

For recent publications on cancer of various types, consult *Price List 51A, Diseases*, obtainable through the Supt. of Documents, Gov't Printing Office, Washington, D.C.

**Cancer Control, American Society for**, a society incorporated in the State of New York, in 1922, whose main object is the collection and dissemination of information concerning the symptoms, diagnosis, treatment, and prevention of cancer, and the compilation of statistics in regard thereto.

**Cancer**, a northern constellation, and the fourth sign of the zodiac, represented by a symbol. In ancient Egyptian uranography Scarabæus replaced Cancer.

**Cancer Research.** See **Cancer**.

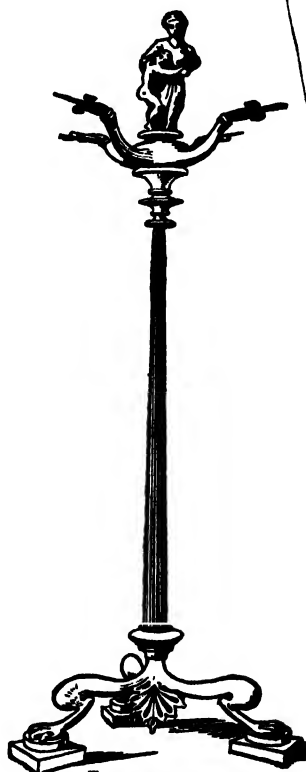
**Cancer Root** (*Epiphegus virginiana*), or **Beechdrop**, a parasitic herb of the order Orobanchaceæ, growing on the exposed roots of beech trees. The whole plant is powerfully

astringent, and was at one time reputed to be of value in cancer. The Indian Pipe (*Mono-tropa uniflora*) is also known as cancer root, and shares the same repute in popular medicine.

**Cancer, Tropic of.** See **Tropics**.

**Cancionero**, (Spanish; Portuguese *cancionero*, 'song book'), in general, a collection of lyrical pieces; in particular, the designation of the official collections of the poetic guilds which flourished throughout in the Middle Ages at the courts of both Spain and Portugal.

**Cancrum Oris**, known also as **Noma**, **Water Cancer**, and **Water Canker**, is a



Bronze Candelabrum, Milan Cathedral

peculiar form of mortification or gangrene, arising apparently from defective nutrition. The disease usually occurs between the second and eleventh years, and is generally preceded by measles or some other disease.

**Candaba**, town, Philippine Islands, in Pampanga province, Luzon, on the Pam-



Greek, with a few Moslems, Jews, and others.

Candia was founded in 823 by Saracens; it stood a famous siege (1667-9), when the Turks captured it from the Venetians. Candia was destroyed by the Germans in 1941. See CRETE. (Also called Iraklion.)

**Candidate** (Latin *candidatus*, literally 'white robed,' Roman candidates being thus arrayed), any person who offers himself or is put forward for election or appointment to some post of honor.

**Candle**, a rod of solidified tallow, paraffin, wax or other fatty material surrounding a wick. A chandler's apparatus has been found at Herculaneum, and a fragment of a candle, supposed to have been made in the first century, is in the British Museum. Wax and tallow were the only materials in use until toward the end of the 18th century, when spermaceti was introduced; and the manufacture of stearin began early in the 19th century. There are three modes of manufacturing candles—by pouring and rolling, for wax candles; by moulding, for most other varieties of candles; and by dipping, sometimes employed for tallow candles, hence called 'dips.' Polishing, to give an extra degree of gloss, is usually accomplished by rolling between cloth-covered rollers. Consult Lamborn's *Modern Soaps, Candles and Glycerine*; Brann't's *Manufacture of Soap and Candles*; Wright's *Animal and Vegetable Oils, Fats, Butters and Waxes, their Preparation and Properties*.

**Candleberry**. See Bayberry.

**Candlefish** or **Oolachan** (*Thaleichthys*), a small fish allied to the smelt, which is found in vast numbers in the river mouths off the northern Pacific coast of North America. The fish is dried and used by the Indians as a torch, as well as for food.

**Candlemas**, the 2d of February, the day on which the Roman Catholic Church annually commemorates the Purification of the Virgin Mary and the Presentation of Christ in the Temple (Luke ii:22ff). On the same day the candles for the use of the church services during the coming year are also consecrated.

**Candlenut**, or **Candleberry Trees** (*Alseodaphne triloba* and *A. moluccana*), evergreen trees belonging to the order Euphorbiaceæ, which grow wild in the Pacific islands and other tropical places.

**Candle-tree** (*Parmentiera cerifera*), a small shrub or tree, native to Panama. It bears fruit not unlike wax candles in appearance.

**Candy Industry**. Legend says that the sons of Noah were the first candy makers when they combined the juice of grapes and grain meal to form a flavorful paste. Written and pictorial records of candy and candy making left by the Egyptians reveal that these early candy makers used honey as a sweetener, sugar being unknown, and added figs, dates, nuts and spices. The sweets were formed in rough, crudely shaped molds and were highly colored.

There is little record of candy manufacturing until about the middle of the 14th century when sugar shipped into Venice was used for making confections. However, it was not until the spread of sugar-cane cultivation and the development of the sugar-refining process that the confectionery industry began to grow. Prior to this time, a confection was an item sold or "dispensed" only by pharmacists and spice stores. The art of candy making had advanced by the 16th century to such an extent that confectioners were making many kinds of sweetmeats and candy using sugar, nuts and fruits. All candy was made by hand, and the few utensils and appliances that were used were primitive in character and the crudest types of mechanical devices.

Not until the latter part of the 18th century was there any noticeable development in the invention of candy machinery. The early machines were clumsy affairs, and gave the candy maker little assistance in increasing the variety or volume of the output. They were, however, the forerunners of the ingenious and complicated machines in use at the present time, without which many of the various kinds of candy could not be made.

The 20th century has seen the development of confectionery manufacture to its present utilization of mechanical inventions, enabling the candy industry to reach a world-wide production of billions of pounds. The United States alone manufactures nearly three billion pounds of candy annually.

### *Ingredients in Candy*

Over twenty-five agricultural products are used in the manufacture of candy, including sugar, corn products, chocolate, eggs, fruits, nuts and peanuts, butter, milk and cream. The principal ingredients of candy are cane and beet sugars, combined with other foods such as corn syrup, corn sugar, corn starch, honey, molasses and maple sugar. To this sweet base are added chocolate, fruits, nuts and peanuts, egg products, milk products,

flavors and colors. In addition to augmenting the varieties of candy, these added ingredients increase the nutritive value of candy.

### *Classifications of Candy*

There are over 2,000 different types of candy, but these all fall into a few general classes.

**HARD CANDY:** The simplest form of candy is the hard candies which are composed mainly of sugar and corn syrup and are characterized by their hard or brittle texture. The ingredients are cooked to a practically moisture-free candy syrup which is flavored, colored and formed into various shapes.

**LOZENGES:** Lozenges and pressed tablets are made from powdered sugar with flavors, colors, natural gums and gelatin added. These ingredients are then kneaded into a dough which is compressed and stamped out by machine into peppermint lozenges, the familiar thin pastel-colored wafers and the small white lozenges with colored printing called "conversational lozenges."

**CARAMELS AND TOFFEE:** Caramels and fondant candies are made by kneading the cooled mass of highly cooked syrup, consisting principally of sugar, with a small amount of corn syrup and fat which are cooked carefully until the desired degree of caramelization and chewy texture have been attained. Toffee is a highly cooked or hard caramel.

**CREAM OR FONDANT CANDIES AND FUDGES:** Cream and fondant candies are made by kneading the cooled mass of highly cooked syrup consisting principally of sugar with a small amount of corn syrup. Fruits, nuts, flavors and colors are added to make the variety of cream centers found in boxed chocolates. When the fondant cream has been prepared it is moulded in starch by the following process: trays are filled with food starch, then imprinted with moulds of whatever shape desired. Fondant cream is deposited in the imprints and allowed to set. When set, the centers are then taken from the trays and cleaned of any starch which might adhere. They are then ready for dipping, crystallizing or glazing.

Crystallized or French Creams which have a sugar crystal jacket are formed by immersing the fondant cream center in a saturated sugar solution until crystals begin to form on the outside of the center.

Fudge, which contains in addition to sugar and corn syrup, milk, cream and edible fats, is characterized by its smooth cream texture.

Flavors, colors, nuts, peanuts, fruit and chocolate are added to give variety.

**JELLIES AND GUMS:** Jellies or gums are made with sugar, corn syrup, and a jellying agent such as starch, pectin, natural gums or gelatin. They are characterized by their jelly-like consistency, varying from soft and tender to a hard and gummy texture.

**MARSHMALLOWS:** This type of candy is made by whipping a combination of sugar, corn syrup, gelatin and/or egg whites and flavors. It is characterized by its light, fluffy texture. Marshmallows are cast in starch in the same manner as creams and jellies.

**NOUGATS:** Nougats are aerated "chewy" candies made by adding a highly cooked candy (made with sugar and corn syrup) to a frappe or whip which is formed by whipping a solution of egg whites and/or gelatin, edible fats, and variety is given by adding fruits, nuts, honey, etc.

**LICORICE:** Licorice candies are made with flour, molasses, sugar, corn syrup, and flavored with licorice extract.

**CHOCOLATE:** Chocolate is used for coating candies and also for the manufacture of bars consisting of plain chocolate and chocolate with peanuts or other nut meats. The chocolate is usually one of four types—1) bitter-sweet; 2) sweet chocolate; 3) milk chocolate and 4) summer-type chocolate (with a high melting point).

### *Coated Candies*

Coated candies are usually a combination of one of the above basic candies and a special coating of chocolate, fondant icing, coconut or nuts. Packaged chocolates are composed of a variety of types of chocolate-coated candies.

**PANNED CANDY:** Coated candies which have a hard glossy jacket are called panned candies, and may be either sugar coated or chocolate coated. Sugar-coated panned candies, which are typified by jelly beans, are produced by putting centers and a specific amount of sugar syrup in huge revolving pans similar in shape to barrels. Coating and polishing are accomplished by the continuous revolving action of the pans. Chocolate-panned candies are coated in the same manner by substituting a chocolate coating in place of the sugar syrup.

### *Candy Bars*

Since World War I, the rise of the popularity of the candy bar has increased tremendously. The candy bar is a combination of

basic types of candy which is individually wrapped and sells for five cents or ten cents. The most popular varieties are the solid chocolate bar with or without peanuts or nuts; the nut roll consisting of a caramel or fudge center rolled in peanuts or nuts and chocolate coated; the chocolate-coated cocoanut bar; the nougat-caramel chocolate-coated bar; and the peanut butter-spun candy chocolate-coated bar.

Further impetus to the candy bar's popularity was given during World War II when the bar was found to be low cost, energy food for industrial workers as well as the members of the U. S. Armed Forces.

### U. S. Candy Production

Annual candy production in the United States averages two and one-half to two and three-fourths billions pounds. Of this nearly one half is in bar goods; approximately 10 per cent in 5¢ and 10¢ specialties; 21 per cent in package goods; and 20 per cent in bulk goods. This amount of candy is produced by 1,686 candy plants with a total employment of 75,165 persons (*Census of Manufactures—1947*).

### U. S. Candy Distribution

Candy is sold through approximately two million retail outlets in the United States, including independent retail stores, chains and theaters. About one-half of the candy manufacturers' production is purchased by wholesalers who in turn distribute it to retailers. The other half of the production is sold directly to retail outlets by the manufacturers.

Consult Matthew Berman's *The How and Why of Candy Making* (1925); A. H. Austin's *The Romance of Candy* (1938); Calvin Kazanjian's *The Confectionery Industry* (1948); U. S. Bureau of Foreign and Domestic Commerce's *Confectionery Sales and Distribution* (annual).

Philip P. Gott, *President,*  
*National Confectioners' Association*

**Candytuft**, a genus of hardy plants of the family Cruciferae. The perennial species are mostly beautiful white-flowering plants from three to nine inches high, usually evergreen and shrubby, and all hardy.

**Cane**, a name applied to certain small palms, as well as to varieties of the larger grasses, such as the bamboo and the sugar-

cane, which have a slender, reed-like stem. Strictly speaking, the name should be applied only to the family of palms (*Calamus*) known as rattans. Owing to their lightness and strength, rattans are employed by the people of the East for the making of baskets, chairs, ropes, and similar objects, and great quantities are exported for similar purposes.

**Canea**, town, Crete. The fortifications and citadel, as well as many other monuments, date from the Venetian period (13th century); p. 35,237; bombed by Germans 1941.

**Canella**, a genus of evergreen tropical trees, of which one, *C. alba*, called 'wild cinnamon,' is a native of the West Indies. 'Canella bark,' is stripped from the young branches, and has tonic properties.

**Canephori**, (Gr. 'basket-bearer'), high-born virgins and other Athenian women selected to carry baskets containing the implements of sacrifice in the panathenaic and other processions.

**Canes Venatici**, the Hunting Dogs, a small constellation close behind the Great Bear, discovered by Hevelius. The 'Whirlpool' nebula, typical of the spiral class, was discovered in Canes Venatici by Lord Rosse.

**Canfield, Dorothy**. See Fisher, Dorothy C.

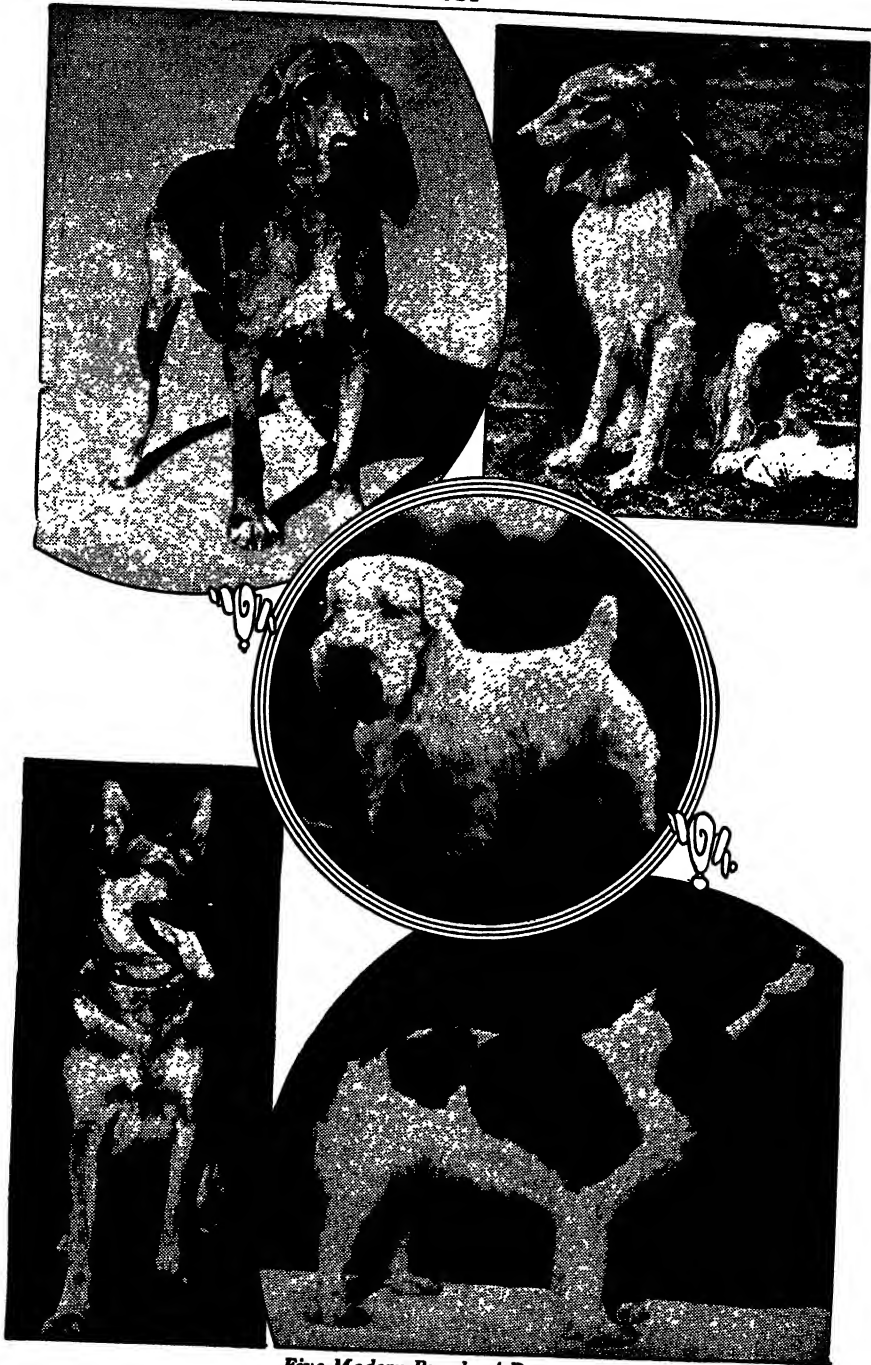
**Canfield, James Hulme** (1847-1909), American educator and librarian. In 1899 he accepted the librarianship of Columbia University. He was secretary of the National Educational Association, 1887-9, and its president, 1890. Besides numerous contributions to the periodical press, he published *Taxation, a Plain Talk for Plain People*, *The College Student and his Problems*, and other works.

**Canfield, Richard Albert**, 1855-1914, Am. gambler for whom the game of solitaire called *Canfield* was named. His famous N.Y. gambling establishment was closed after a two-yr. fight in the courts in 1904, his second place in Saratoga Springs was closed 1907.

**Cang** (*cangue, kae*), a Chinese instrument of punishment for trifling offences, being a kind of wooden cage fitting closely round the neck, with the weight proportioned to the nature of the offence, but so constructed that the culprit cannot lie down or feed himself.

**Canicular Days**. See *Dog Days*.

**Canidae**, the name of the dog family. The Canidae are much less highly specialized forms than the cats. Most of the dogs hunt in packs. To the genus *Canis* belong dogs,



*Five Modern Breeds of Dogs.*

Upper left, Bloodhound; upper right, Collie; center, Sealyham Terrier; lower left, Police Dog; lower right, Spaniel.

wolves, jackals, and foxes, animals which differ from one another only in minor peculiarities. The wild dogs of Asia are placed in a separate genus, *Cyon*; while the genera *Otocyon* (Cape fox), *Lycaon* (Cape hunting dog), and *ICTICYON* (American bush dog) differ from the type in some respects. See **DOG**; **FOX**; **WOLF**.

**Canigou, The**, a snow-capped mountain (9,137 ft.) at the eastern end of the Pyrenees. Here, 5,600 ft. above the sea, are famous manganese mines, which have been worked since the 13th century.

**Canina, Luigi** (1795-1856), Italian architect and antiquary, was professor of architecture at Turin, where he produced his standard work upon ancient architecture—*L'Architettura Antica descrittave dimostrata coi Monumenti*. He likewise carried on important excavations at Tusculum and on the Appian Way.

**Canisius College**, a Roman Catholic institution of learning in Buffalo, N. Y., opened in 1870 and incorporated in 1883, under the control of the Fathers of the Society of Jesus and registered by the Regents of the University of the State of New York.

**Canis Major**, the Dog of Orion, one of Ptolemy's southern constellations. Sirius is its leading star.

**Canis Minor**, an ancient constellation representing the Dog of Icarus, is situated northward of Canis Major. Procyon is its chief star.

**Canister Shot**. See **AMMUNITION**; **CASE SHOT**.

**Canitz, Friedrich Rudolf Ludwig von** (1654-99), German poet, was the opponent of the mannerisms and extravagance of the second Silesian school, taking Horace and Boileau as his models. *Nebenstunden unterschiedener Gedichte*, appeared anonymously in 1700; a complete edition, with name and biography, in 1719.

**Canker**, a disease of fruit trees characterized by the splitting and death of part of the bark. Much the most important form of canker is that caused by the growth of various fungi. Canker often begins at the point of junction of two branches. In early autumn the fruits of the fungus may be seen, in the form of white specks, in crevices of the overgrown bark surrounding the wounds. In the spring another form of fruit, consisting of tiny reddish balls, appear in the same situation.

**Cankerworm**, two destructive caterpillars

of geometrid moths—the spring cankerworm (*Paleacrita vernata*) and the autumn cankerworm (*Alsophila pometaria*)—found in the United States from Maine to Texas. The eggs are laid on fruit and shade trees, and the larvæ frequently destroy the foliage of whole orchards in a few days. Spraying the trees with arsenicals, if thoroughly done, will kill the worms.

**Canmore**. See **MALCOLM III.**

**Canna**, or **Indian Shot**, ornamental plants belonging to the order *Cannaceæ*.

**Cannabis**, a genus of plants belonging to the order *Urticaceæ*, contains a single species, *C. sativa*, the common hemp.



*Common Hemp*

1, Male flower; 2 female; 3, fruit; 4, seed.

**Cannæ**, ancient town, Italy. In 216 B. C. it was the scene of Hannibal's disastrous defeat of the Romans.

**Cannel Coal**. See **COAL**.

**Cannes**, seaside resort, France. Hills, rising to Le Cannet, two m. distant, cut off the northern winds and render the climate one of the most equable in Europe. These natural advantages have won for Cannes the title 'Pearl of the Riviera' and have made it one of the most popular of the Mediterranean resorts; p. 45,548. The Abbey Donjon was built in 1070.

**Cannibalism**, the practice of eating human flesh is still observed among primitive peoples and in the past held its place even among tribes of a comparatively high level of

culture. It has been inspired by a variety of motives, ranging from simple economic necessity to filial respect. A modified form of cannibalism has been developed by the belief that one may acquire the dominant qualities of a man or an animal by eating a portion of the dead body, notably the heart. The eating of one's kinsfolk—*endophagy* or *endocannibalism*—was practised as a pious funeral rite by the ancient Egyptians and Libyans, as appears from the discoveries of Flinders Petrie. Cannibalism may be traced in the early history of many peoples. Of living races who practise it the natives of New Guinea and some Central African tribes (Mangbatu, A-Zandeh, Fans) are the most conspicuous. Consult R. S. Steinmetz' *Endocannibalismus*; Loeb's *The Blood Sacrifice Complex* in *Memoirs of American Anthropological Association* (1923).

**Canniff, William** (1830-1910), Canadian physician and author. During the American Civil War he attended the hospitals in Washington, and served for a short time in the Army of the Potomac.

**Canning.** See *Foods, Preserved*.

**Canning, Charles John, Earl** (1812-62), British statesman, was chosen in 1856 by Palmerston, to succeed Lord Dalhousie as governor-general of India. He became first Viceroy of India in 1858, and the following year was created earl.

**Canning, George** (1770-1820), British statesman. In 1796 Canning became under-secretary for foreign affairs. He refused office in the 'Ministry of All the Talents,' 1806, but became foreign secretary in the Tory administration which succeeded it. Throwing himself with energy into the war against Napoleon, he planned the capture of the Danish fleet. The failure of the expedition to Walcheren (1809) led to a duel between Canning and Castlereagh, the secretary of war. Succeeding Castlereagh as foreign secretary in 1822, Canning protected Portugal from Spanish intervention, and so far allowed the claims of Greek independence as to propose the alliance of England, France, and Russia, which resulted after his death in the battle of Navarino. The retirement of Lord Liverpool in 1827 placed Canning at the head of the government. His premiership lasted only four months, a severe chill aggravated by mental anxiety causing his death on August 8, 1827. He was buried in Westminster Abbey.

Consult Stapleton's *Political Life of Canning*, and *Canning and his Times*; Marriott's *George Canning and his Times*; Temperley's

*Life of Canning*.

**Cannizzaro, Stanislao** (1826-1910), Italian chemist, cleared up Avogadro's hypothesis as to the difference between atomic and molecular weights.

**Cannock, England.** Important coal-mining and iron-manufacturing town; p. 32,321.

**Cannon.** See *Artillery*; *Guns*.

**Cannon, Annie Jump** (1863-1941), American astronomer, assistant at the Harvard College Observatory, and curator of astronomical photographs. Her publications include a bibliography of variable stars comprising about 75,000 references, a catalogue of 225,000 stellar spectra, which fills nine quarto volumes.

**Cannon, James, Jr.** (1864-1944), Bishop of the Methodist Episcopal Church South since 1918. In the 1928 Presidential campaign he came into national prominence through his violent opposition to the candidacy of Alfred E. Smith. After the campaign he was assailed from within and without the church for having brought the church into politics.

**Cannon, Joseph Gurney** (1836-1926), American political leader. He was representative in Congress until his voluntary retirement in 1923, a period covering half a century with the exception of four years. He was elected Speaker.

'Uncle Joe' was Speaker of the House for eight years, from the Fifty-eighth Congress in 1903 to the end of the Sixty-first in 1911.

**Cannon-ball Tree** (*Couroupita guianensis*), a South American tree belonging to the order Myrtaceae.

**Cannon Bone**, the single bone formed in many artiodactyle ungulates by the fusion of the third and fourth metacarpals or third and fourth metatarsals, the fusion producing a single strong bone with a complicated method of articulation to the two digits below.

**Cannon Pinion**, the small cogged wheel to which the minute hand of a watch is attached.

**Cannstatt, or Kannstatt**, town, Germany, is a flourishing industrial place. Good fruit and wine are grown. The waters were known to the Romans, who established baths here in the 8th century; p. about 27,000.

**Cannula**, a small tube used in surgery, through which any abnormal collection of fluid is drawn from the body.

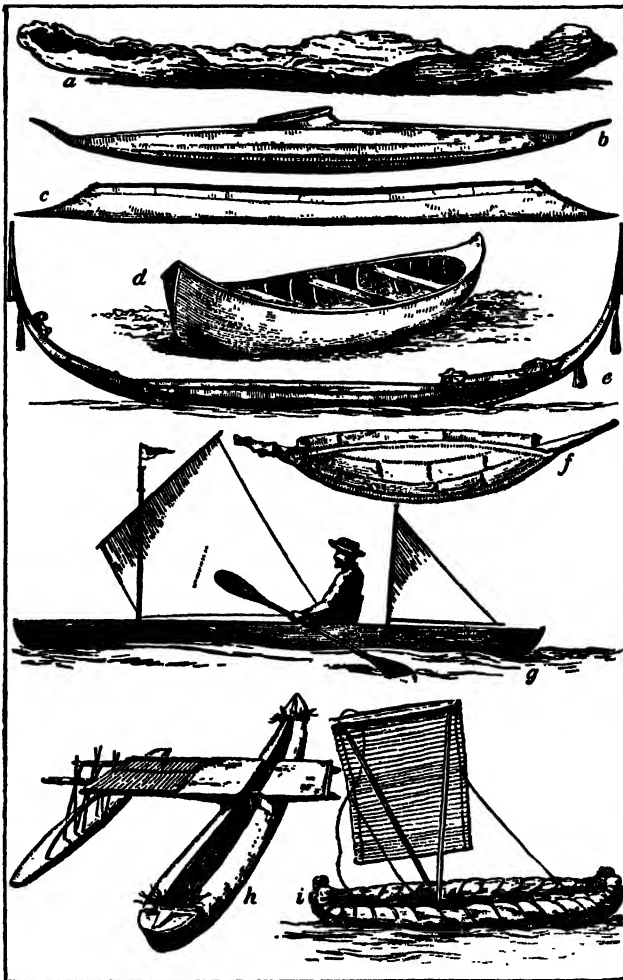
**Cano, Alonso** (1601-67), Spanish painter, sculptor, and architect. Philip IV. nominated him 'painter to the king' and royal architect. His chief architectural work is the cathedral at Granada.



**Cano**, Juan Sebastian del (c. 1460-1526), Spanish navigator, took part in Magellan's voyage around Cape Horn in 1519. In the sole surviving ship of the fleet he returned, by the Cape of Good Hope, to Spain (1522), and was thus the first circumnavigator of the globe.

**Canoe**, a light boat without any fixed fulcrum to assist the user of the paddle by

which the canoe is usually propelled. The canoeist, accordingly, always sits with his face toward the bow. Canoes are constructed of many different materials and in a great variety of shapes. Some native canoes have decks, others are fitted with outriggers; some are barely large enough for a single occupant, while others, especially the 'war canoes' of the Pacific Islanders, carry from



*Types of Canoes.*

*a.* Ancient dug-out (British Museum). *b.* Eskimo kayak. *c.* Kootenay Indian birch-bark canoe. *d.* Canadian birch-bark, or wood canoe. *e.* Solomon Islands canoe. *f.* Vanatahi canoe, Paumotu Archipelago. *g.* 'Rob Roy' canoe. *h.* Outrigger canoe, Pacific Islands. *i.* Peruvian canoe from Lake Titicaca, made of grass or palm and rope

forty to fifty persons. Canoes are built of many kinds of wood, but mahogany, cedar, and basswood are the favorites; many are made of paper and some of canvas especially treated to resist the action of the water. The birch-bark canoe of the Indian was the first type employed in America, and is still in use, although it has been generally supplanted by craft of lighter wood. Consult MacGregor's *A Thousand Miles in the Rob Roy Canoe*, *Rob Roy on the Baltic*, and *Rob Roy on the Jordan*; Baden-Powell's *Canoe Travelling*; Steele's *Canoe and Camera*; Miller's *The Boys' Book of Canoeing and Sailing* (1917); Jessup's *The Boys' Book of Canoeing*.

**Canon**, in ecclesiastical usage a rule of faith or practice, established by competent authority. The body of these rules constitutes the Canon Law of the Roman Catholic Church.

**Canon**, a member of the chapter of a cathedral or collegiate church, living in a community under definite rules. The name is now applied to certain clergy who form a sort of council to the bishop and perform certain duties in the cathedral church.

**Canon**, in music, a species of composition written strictly according to rule—whence the name. A canon may be composed in two, three, or more parts, and invariably consists of a melody executed by one part, and imitated, note for note, by another part, beginning some beats later at either the same or a different pitch. For examples, consult Purcell's *Gloria Patri* in his Collection; also Ouseley's *Treatise on Counterpoint, Canon, and Fugue*.

**Cañon**, or **Canyon**, a name signifying 'a gorge,' applied originally to the deep, narrow gorges in the Western United States, cut by rivers in the solid rock, the most notable example being the Grand cañon of the Colorado.

**Cañon City**, city, Colorado, county seat of Fremont co. It is beautifully situated at the mouth of the Grande Cañon of the Arkansas, at an altitude of 5,343 ft. Its zinc-lead smelting works are among the largest in the world. Hot mineral springs and mild climate make the city an important health resort; p. 6,345.

**Canoness**, originally a woman who took a vow to remain unmarried and gave herself to good works, living in her own home. Later the regular canonesses practised a life of austerity and poverty, but the secular canonesses were allowed to possess property

to an unlimited extent, and their duties consisted in instructing young girls.

**Canonical Hours**, certain hours of the day set apart by church canon for prayer and devotion. Prime, 6 A.M.; Tierce, 9 A.M.; Sext, at noon; Nones, 2 or 3 P.M.; Vespers, about 4 P.M.; Compline, 7 P.M.; Matins and Lauds, at midnight or daybreak. In the Church of England the term refers to the time during which marriage may be legally solemnized: i.e. 8 A.M. to 3 P.M.

**Canonization**, the formal process by which the Roman Catholic Church bestows on a person the title of 'saint' and enrolls his or her name on the list of saints, the *Canon Sanctorum*. In modern times the person who is thus honored must have first passed through the intermediate stage of beatification. This ceremony, which takes place publicly in St. Peter's at Rome, after a lengthy and minute inquiry into the life of the candidate, and conclusive proof that he has worked miracles, consists of the solemn publication of the decree by the Pope. After at least two miracles performed subsequent to beatification, and a further searching inquiry, canonization may follow, an interval of at least fifty years between canonization and death being generally insisted on.

**Canon Law**, in the Roman Catholic Church the body of church laws. The Canon Law has naturally been of the greatest importance in Roman Catholic countries, but its influence on the legal systems of other countries and on international law has been great. The best edition of the *Corpus* is Friedberg's. Consult, also, histories of the canon law by Schulte and Hinschius, the English translation of *Apostolic Canons* by T. MacNally, and Mansi's collection of the canons of councils.

**Canonsburg**, borough, Pennsylvania, in Washington co., founded in 1802, and formerly the seat of Jefferson College. The 'Old Black Horse Tavern,' which was recently torn down, was the home of the Whiskey Rebellion; p. 12,072.

**Canopus**, a lustrous southern star in the constellation Argo.

**Canopus**, an ancient town in Egypt, was near the modern Aboukir and the westernmost mouth of the Nile, hence called the Canopic mouth. The town was famous for a temple of Serapis, and was a favorite resort of the Alexandrians. Canopic vases, with tops shaped like human heads, to hold the viscera of embalmed bodies, were manufactured here.

**Canopy**, the protecting covering held over the heads of monarchs and other dignitaries, or the covering suspended over a bed. In architecture the term indicates a roof-like ornament or moulding.

**Canova, Antonio** (1757-1822), Italian sculptor, reviver of the classic school. In 1780 Canova went to Rome, producing, among other groups, several representations of *Cupid and Psyche*, and *Venus and Adonis*. He executed *Perseus with the Head of Medusa* for the Vatican. In 1815 he was sent to France as emissary of the Pope to seek the return of art treasures removed by Napoleon. As a reward for his success, he was made Marquis of Ischia. Besides the works already spoken of, may be mentioned *Mars and Venus*; *Hebe*; *Pius VI.*; *George Washington*, and many portrait busts of contemporaries.

**Canovas del Castillo, Antonio** (1828-97), Spanish statesman and historian. He was banished after the revolution of 1868 but returned in 1869 and was one of the leaders in the movement to put Alfonso on the throne. He became premier in 1875 and held that office with various intervals until his assassination by an anarchist in 1897. Among his works are *Estudios literarios* (1868), *Problemas contemporáneos* (1884), *Estudios del reinado de Felipe IV.* (3 vols. 1888-90). Consult Creux's *Antonio Canovas* and Pons y Humbert's *C. del Castillo*.

**Canrobert, François Certain** (1809-95), marshal of France. In the Italian war he was present at Magenta and Solferino and in the Franco-German War commanded the Sixth Army Corps. After the war he entered political life and became a Senator. Consult *Biographies*, in French, by Martin and Bapst.

**Cant**, generally a corner, angle, or niche. In architecture, it indicates the corner of a square cut off octagonally. In nautical language, it describes a tilt or inclination, or ship's timber near the bow or stern, lying obliquely to the keel.

**Cantab.** (*Cantabrigiensis*), of Cambridge, England.

**Cantabile** and **Cantilena**, musical terms denoting a smooth-flowing, sustained method of performance.

**Cantabria**, the name applied in ancient times to a district of Spain on the southern coast of the Bay of Biscay.

**Cantabrian Mountains**, a chain of mountains, an offshoot of the Pyrenees.

**Cantabrians**, or **Cantabri**, the name applied in ancient geography to the inhabi-

tants of the part of Spain lying to the s. of the Bay of Biscay. The Basques claim descent from this brave people.

**Cantabricum Mare**, ancient name of the Bay of Biscay.

**Cantacuzenus**, (c. 1292- c. 1380), John VI., emperor of the East, was born in Constantinople. In 1354 a popular revolt in behalf of Palæologus forced Cantacuzenus to resign, and he retired to a monastery, where he wrote the history of the empire from 1320 to 1360.

**Cantal**, department of Central France, in the former province of Auvergne. The centre of the department is occupied by a large volcanic mass, the culminating point being Plomb du Cantal (6,095 ft). The natural beauties and the numerous mineral springs attract many tourists; p. 186,843.

**Cantaloupe**. See **Melon**.

**Cantarini, Simone** (1612-48), known also as Simone da Pesaro, Italian painter and etcher, a pupil of Guido Reni.

**Cantata**, literally a composition to be sung, as opposed to one to be played (sonata). The earliest form consisted of a recitative (developed from the early opera) given by one person to a simple accompaniment on lute, 'cello, harpsichord, or other instrument, the text being a short drama or story in verse. Whether or not Carissimi is the inventor of the cantata, to him is due its transference, in the 17th century, to the church from the chamber. Other writers of the period who improved upon the recitative were Lotti, Marcello, Gasparini, and Cesti.

The beginning of the 18th century saw the development of a more extended form, in which various movements were incorporated. Domenico Scarlatti and Pergolesi produced splendid works, of which the latter's *Orfeo ed Euridice* is perhaps most notable. The end of the line of composers using the single voice came with Handel, whose accompaniments included strings and oboes. Bach enriched the literature by a long list of church-cantatas. The 19th century saw an enlargement of subjects; elaborate works became possible through the active work of numerous choral societies.

**Canteen**, a soldier's wooden, leather, or metallic flask for water or other liquid, of about two to two and a half pints capacity.

The word canteen is also applied to the store and recreation centre, a club for the enlisted men, managed on a co-operative basis.

**Cantemir**, or **Kantemir**, **Antiochus**

**Dmitrievitch** (1709-44), Russian satirist and diplomatist, son of Dmitrii Cantemir. In 1730 he was appointed Russian ambassador to London, and in 1738 to Paris. He may be considered to have introduced the pseudo-classical spirit and ideals into Russian literature.

**Cantemir, Dmitrii** (1673-1723), prince of Moldavia, and Roumanian historian. In 1687 his brother Antiochus became prince of Moldavia, and Dmitrii seized the opportunity to learn the chief Oriental languages. At the beginning of the war with Russia, he was sent to Moldavia, where he betrayed the interests of the Porte and formed an alliance with Peter the Great. Among his numerous works, written in Roumanian, Latin, Greek, and Turkish, is *History of the Growth and Decay of the Othman Empire*.

**Canterbury**, city and municipal and parliamentary borough, England, in Kent, famous as the ecclesiastical metropolis of England; 55 m. s.e. of London. The main feature of the town is the Cathedral, on the site of the ancient monastery church of St Augustine destroyed by fire in 1067. The n.w. transept, the scene of the murder of Thomas à Becket, known as the Martyrdom, contains a small stone slab to mark the spot where the archbishop is said to have fallen. At the easternmost end is the circular chapel called the Corona or Becket's Crown in which the martyr's skull is said to be preserved. The Corona also contains the ancient stone chair used at the enthronement of all bishops. The spacious crypt, dedicated to the Virgin, contains a stone coffin said to hold the bones of à Becket. The cathedral contains many interesting and notable monuments, chief among which are the tombs of Edward the Black Prince and of Henry IV. and his queen.

Other features of interest in the town are the remains of the ancient city wall and gates; the Guildhall; St. Martin's Church, parts of which date from the 4th century and several mediæval houses. The most notable event in the history of the cathedral and of the city was the murder of Archbishop Thomas à Becket in 1170, and the subsequent penance performed here by Henry II. As a shrine for pilgrims it was celebrated by Chaucer. Pop. 27,778.

**Canterbury**, district, South Island, New Zealand; Christchurch is the capital and Lyttelton the chief port; p. 213,890.

**Canterbury, Archbishop of.** See **Archbishop**.

**Canterbury Bell.** See **Campanula**.

**Canterbury Tales.** See **Chaucer**.

**Cantharides**, zoologically the name of a sub-family of the Cantharidæ, or Blister Beetles, to which *Cantharis* or *Lytta vesicatoria*, the 'Spanish fly,' belongs. The blister beetles are remarkable on account of their life history, which is singularly complicated. *Epicauta vittata*, an American cantharid, which lives on the eggs of locusts, displays no less than eight stages in development, including two pupæ. The blistering fluid apparently protects the beetles from the attacks of insect-eating animals.

**Canticles**, commonly called the **Song of Solomon**, or **Song of Songs**, a short book of the Hebrew Scriptures. The Jewish rabbis and the early Christian exegetes (e.g. Origen) generally regarded it as an allegory, intended to express Jehovah's love to Israel or Christ's to the church ('the bride') in the language of human affection. This view has still its adherents. At present, however, the literal interpretation holds the field, but in two forms: (1) the dramatic, according to which either two main characters, Solomon and the Shulamite maiden, or three (the shepherd lover being added) are represented—held by Delitzsch and Ewald respectively; and (2) the lyrical, developed mainly by Karl Budde, who understands the Song as a collection of nuptial lyrics, like those used among the Syrian peasantry at the present day: the married pair are king and queen for the marriage week. The presence of foreign words in the Song indicates a date not earlier than the 3rd century B.C. Consult Driver's *Introduction to Literature of the Old Testament*.

**Cantilever**, essentially a bracket, or structure extending horizontally from a fixed base, by which alone it is supported. In architecture the cantilever is largely used for the support of balconies and other projecting portions of a building, filling often an important place also in the ornamental system of the structure. Some of the earliest known bridges, of a span too great to be crossed by a single log, were constructed on the cantilever principle, examples of this type existing at the present day in India and Japan. In modern engineering practice the cantilever principle is adapted in bridging spans too great to be conveniently crossed by girders alone, and for which the suspension system would not be suitable. For instance, on the Forth Bridge, Scotland, each pier supports two cantilevers, which stretch out horizontally on either side and balance each

the weight of the other, the outer ends being connected by short girders at the centre of every span.

**Cantire.** See **Kintyre**.

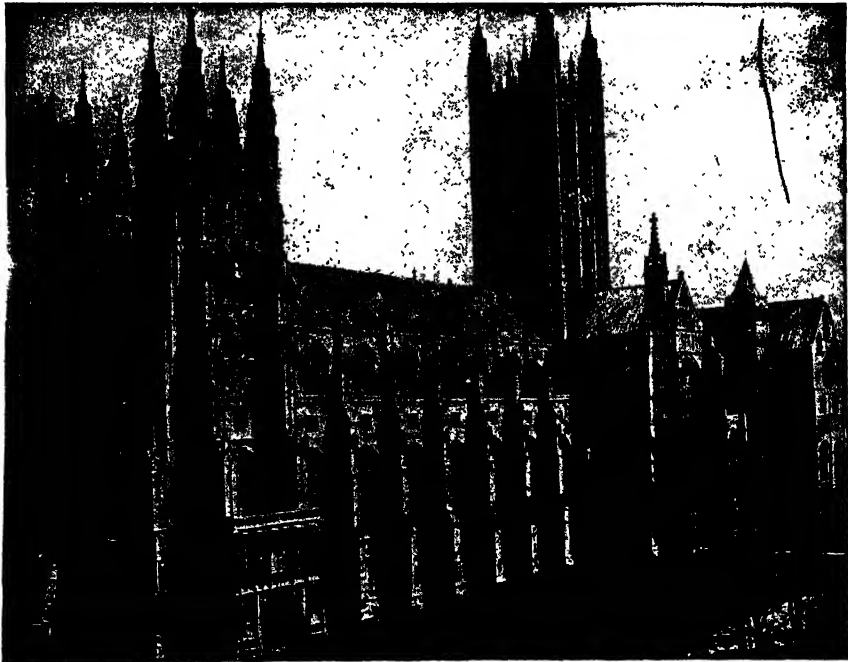
**Canto Fermo.** See **Plain Song**.

**Canton**, in Heraldry, one of the subordinates. See **HERALDRY**.

**Canton**, in Switzerland, a geographical administrative area or state having its own laws and a local government which deals with domestic affairs. In France the term is applied to a subdivision of the *arrondissement*.

number of modern European buildings have been constructed. Many of the streets, however, are narrow and crooked, lined with low, red-roofed structures of brick, stone, or wood. Overtopping these are the Plain Pagoda; the Flowery Pagoda; the Gothic shafts of the French Roman Catholic Cathedral; and the towers of the numerous pawnshops.

Many distinctively Chinese industries are carried on in Canton, notably the making of blackwood furniture and pottery. Canton was formerly the chief commercial city of



*Canterbury Cathedral.*

**Canton** (Chinese *Kwang-chau-fu* or *Sheng-cheng*), city, China, capital of the province of Kwang-tung, and the first Chinese port to be opened to European trade, is situated on the Pearl River. It is surrounded by walls of brick and sandstone and by a moat. It is moreover, divided by a second wall, running e. and w.

Without the walls, on either side of the river, are the suburbs, while banked along the stream lie thousands of sampans or native water craft, on which a great part of the native population make their permanent homes. *Shameen* is the foreign residence section and the seat of the chief consulates. A

China; but it has declined in importance, though it has still a large trade. The history of Canton dates back to several centuries before the time of Christ. In the 7th century the East India Company established a monopoly of the foreign trade which lasted until 1834. In 1842 it was named as one of the five treaty ports. It was attacked in 1857, and was occupied by a French and English garrison until 1861. It was air-bombed by Japanese, 1938-39, with disastrous results.

**Canton**, town, Missouri, Lewis co., on the Mississippi River. It is the seat of Christian University (Christian); p. 2,490.

**Canton**, village, New York, county seat of



SONG SPARROW (1/2 nat. size)



CARDINAL (3/8 nat. size)

FROM DRAWINGS BY E. I. BRASHER



St. Lawrence co. St. Lawrence University (Universalist), Universalist Theological School, and State School of Agriculture are situated here; p. 4,379.

**Canton**, city, Ohio, county seat of Stark co. Canton is an important manufacturing city. Leading articles of manufacture are steel and steel fabricated products. Shale of the finest quality for the manufacture of brick and tile, clay, limestone, and coal are found in the vicinity; p. 116,912.

**Canton, John** (1718-72), English electrician. He repeated and verified Franklin's experiments and hypotheses; was the first to make powerful artificial magnets; 'Canton's phosphorus,' was discovered by him in 1768.

**Cantonment**. In order to maintain the efficiency of a command, the troops composing it must have adequate shelter. Shelter for troops comes under one of the following heads: cantonment, camp, bivouac, or billet. When troops are occupying buildings in towns or villages or huts specially constructed, they are in cantonments. Temporary shelter for troops in the United States is either in camps or cantonments. For the names and location of the National Army cantonments see **CAMP, MILITARY**.

**Canton River** (Chinese *Chukiang*, 'pearl river'), an arm of the delta of the Si-kiang, province of Kwang-tung, China. About 45 m. below Canton the river is guarded by the Bogue Forts, taken by the British in 1841 and 1856.

**Cantor**. See **Precentor**.

**Cantor, Eddie** (1893- ), comedian, born in New York City, where he began his career by winning prizes in amateur performances and in popular vaudeville. He went on tour in 1916, played on Broadway, 1920, began to star in 1923, and made his first appearance in motion pictures in 1926. Since that time he has risen to great popularity and high financial rewards in this field. He is known as a philanthropist, his special interest being in sending, with the help of his associates, 3,000 boys each year to summer camps. Two of his well-known films are 'Kid Boots' and 'Roman Scandals.'

**Cantù, Cesare** (1804-95), Italian historian and novelist. His chief work is his monumental *Storia Universale* (1836-42), in 35 volumes.

**Canuck**, a nickname in the United States for a Canadian; in Canada, used by the English for a French Canadian.

**Canusium**, Italy.

**Canute, Cnut or Knut**, called **The Great** (995-1035), King of England, Denmark, and Norway, was the son of Sweyn of Denmark. On the death of his father, during an invasion of England, Canute was proclaimed king of that country, but his supremacy was contested by Edmund Ironsides, son of Ethelred I., who was at that time a refugee in Normandy. Within a short time, however, Edmund was treacherously assassinated, and Canute was proclaimed king of all England. On the death of his brother Harold, in 1019 he became king of Denmark also. He conciliated the higher clergy by his liberality and secured his position still further by the creation of a standing army. Canute overawed and partially subjugated the Wendish pirates; and when the kings of Norway and Sweden invaded Denmark, checked them at the battle of Helgeaa (1026). In 1027 he made a pilgrimage to Rome, and in 1028 invaded Norway, and added it to his dominions. A famous story relates how he proved to his flattering courtiers that the waves did not retreat at his command. He was buried at Winchester.

**Canute IV.**, called **The Saint**, king of Denmark (d. 1086), was elected king in 1080. He built many churches, including the Cathedrals of Roskilde and Lund. He was canonized in 1101, and is regarded as the patron saint of Denmark.

**Canvas**, a strong, heavy cloth. Though canvas for sail-cloth and tarpaulins is sometimes woven from cotton and other fibres, the finest and strongest kinds are made from flax.

**Canvasback Duck** (*Aythya vallisneria*), a fresh-water duck, widely distributed throughout North America. It greatly resembles the redhead duck, from which it may be distinguished by its longer, darker head and wedge-shaped beak. It is highly prized for the table on account of its delicate flavor.

**Canyon**, or **Cañon**, a deep gorge with steep sides. See **GRAND CANYON**.

**Canzone**, an Italian and Provençal form of poetry, used chiefly for love themes. The earliest Provençal specimens date from the 12th century. Dante, Petrarch, Tasso, and Leopardi all wrote in this *genre*. In music, canzone and canzonet are songs in two or more parts.

**Cao-Bang**, or **Kao-bang**, district, Tongking, consisting of mountainous country, rich in forests and minerals. The capital of the same name is 72 m. n.w. of Lang-son; p. 6,000.



**Caoutchouc.** See Rubber.

**Cap.** See Bonnet; Percussion Caps;

**Capacity,** in electricity. See Electrostatic Machines.

**Capacity,** in law, signifies the power of exercising legal rights. The rules governing legal capacity vary in relation to the matter in hand.

**Capaneus,** Greek hero who took part in the first expedition of the Seven against Thebes. Consult Æschylus' *Seven Against Thebes*; Euripides' *Phænissæ*.

**Cap-à-pie,** (French, 'head to foot'), in the language of the Middle Ages, a term applied to a knight armed at all points.

**Cap Bon,** 30-by-60 m. peninsula in n. Tunisia, reaching toward Sicily. Here in May, 1943 the Axis Powers made their last stand in the Battle of Africa.

**Cap de la Hague,** France. It extends into the English Channel opposite Alderney.

**Cape.** For articles on prominent Capes, see the principal word as ANN; HATTERAS.

**Cape Ant Eater, or Aardvark** (*Orycteropus capensis*), a South African mammal usually placed in the order Edentata. It is a nocturnal burrowing animal, feeding on termites and ants. It is ungainly and ugly in appearance; the mouth is elongated and tubular, the tongue vermiform.



*Cape Ant Eater*

**Cape Breton Island,** rocky island of irregular form, Canada, at the eastern extremity of the province of Nova Scotia, of which, politically, it forms a part. The beautiful scenery around the shores of this lake and the salubrity of the climate have made Cape Breton Island a favorite tourist resort. The capital is Sydney, which has iron and steel works. Cape Breton Island was assigned to France by the Peace of St. Germain (1654). After the loss of Acadia, the town and harbor of Louisburg were elaborately fortified and became the headquarters of the French operations against the English colonies. The fortress was captured by the British in 1758; p. about 130,000, mainly of Scotch Highland descent.

**Cape Buffalo.** See Buffalo.

**Cape Cod,** peninsula of Massachusetts, practically coextensive with Barnstable co. It is formed like a hook, enclosing Cape Cod Bay, and is about 65 m. long. On Race Point, the northwestern extremity, is a light of the fourth order. There are numerous lights at the harbors on the western side; and on the Atlantic Coast, Highland Light, 183 ft. above high water, is of the first order. Barnstable, on an inlet of Cape Cod Bay, is the largest town. The native inhabitants are mainly descendants of the original Pilgrim settlers. The peninsula consists almost entirely of sand, but is favorable to cranberry culture, which is extensively carried on. The fisheries afford the chief occupation, and the men are excellent sailors. In 1909-14 a canal across Cape Cod, from Barnstable Bay to Buzzards Bay was constructed, which enables vessels to avoid the dangerous trip around the Cape. See CAPE COD CANAL.

**Cape Cod Canal,** a canal connecting Buzzards and Barnstable Bays, off the coast of Massachusetts. Soon after their arrival at Plymouth in 1620, the Pilgrims recognized the need of a direct waterway connecting Barnstable and Buzzards Bay. As early as 1627 they had established a trading post on the shore of Buzzards Bay (at the present entrance to the canal), which was one point in the direct trade route between the Plymouth colony and the Dutch colony at Manhattan Island. This route Governor Bradford described in his diary. On June 1, 1899, the legislature granted a charter incorporating the Boston, Cape Cod, and New York Canal Company, under which the company began in 1909 to construct the present canal. It was formally opened for partial operation on July 29, 1914. The canal is 13 m. long; the width varies between 500 and 700 ft., and the depth at low water is 32 ft. The canal is spanned by three modern bridges, two highway bridges and a railroad bridge. The railroad bridge is a vertical lift bridge with a movable span 544 ft. long, the longest span of this type in the world. The vertical span is run up and down on two towers at either end and is kept at a raised position and lowered only for passing trains. The highway bridges, connecting with the road system of Eastern Massachusetts, are fixed high level bridges and remain in position. These clear 135 ft., which includes, with few exceptions, the height of all vessels using the port of Boston. The canal is lighted by electricity, the lights being on poles placed opposite each

other 500 ft. apart on either side of the canal, and other necessary aids to navigation have been provided. The depth and width of this canal compare favorably with corresponding dimensions of the great ship canals of the world, and permit of the passage not only of vessels engaged in coastwise freight and passenger traffic, but also of the smaller vessels of the navy, including even naval cruisers. In March, 1928, the canal was purchased by the U. S. Government for the sum of \$11,500,000. Since its acquisition the Government has spent much more than the original cost, in way of improving the canal, and building bridges, etc. A Mass. National Guard camp is located near the canal.

The distance between Boston and New York City by way of Vineyard Sound is 334 statute m., and by way of the canal 264 statute m., the latter route being shorter by 70 statute m., and making possible a saving of about four hours in time of transit. The traffic carried through the canal per annum amounts to some 3,500,000 tons, valued at about \$190,000,000.

**Cape Colony.** See **Cape of Good Hope.**

**Cape Fear River,** river, North Carolina. It is navigable for 150 m. to Fayetteville. Rice fields are a feature along its lower course.

**Capefigue, Jean Baptiste Honoré Raymond** (1802-72), French historian. His works, which are still read for their picturesque and piquant style, comprise nearly one hundred volumes and include *Richelieu*, *Mazarin, et la Fronde* (1836-6); *Philippe d'Orléans* (1838); *La ligue* (1843).

**Cape Haitien, or Le Cap,** city and seaport, Haiti. Under the rule of the French it was the capital of the colony; p. 20,000.

**Cape Horn.** See **Horn, Cape.**

**Cape Hunting Dog,** a dog belonging to the family Canidae, found in many parts of Africa. It is somewhat like a mastiff, and hunts in packs, which sometimes ravage the sheep farms of South Africa.

**Cape Jasmine.** See **Jasmine.**

**Capek, Karel** (1890-1938), Czech dramatist and author. Two of his plays have been translated into English: *Rossum's Universal Robots* or *RUR*, and *And So Ad Infinitum*. The former introduced the word *robot* into the English language. Several of his novels are now in English. His brother Josef collaborated with him.

**Capelin, or Caplin** (*Mallotus villosus*) a small fish, six to eight inches long, resembling a smelt.

**Capell, Edward** (1713-81), Shakespearean commentator. As a textual critic, Capell was singularly acute.

**Capella,** one of the three brightest stars in the Northern Hemisphere (photometric magnitude 0.21).

**Capella, Martianus Mineus Felix,** learned author who flourished about the 5th century. The work which has preserved his name to posterity is the *Satyricon*, an encyclopædic compilation drawing its material mostly from Pliny and Varro, highly esteemed during the Middle Ages as a work of reference.

**Cappello (Cappello), Bianca** (c. 1542-87), Tuscan grand duchess, was born in Venice, of a noble family, and eloped with a banker's clerk, Pitro Buonaventuri, who took refuge with Francesco de' Medici. Francesco, himself married to an archduchess of Austria, was attracted by Bianca's beauty, and caused the death of Buonaventuri in 1570. On the death of the grand duchess, Francesco was persuaded to marry Bianca; but it has been surmised that the Cardinal poisoned them, as both Francesco and Bianca died a few days after meeting him at Poggio à Cajano. Several tragedies have been written, based on her career.

**Cape May City,** summer resort, New Jersey, in Cape May co.; p. 3,607.

**Capen, Edward Warren** (1870- ), American sociologist. His published works include *Historical Development of the Poor Law of Connecticut*; *Sociological Progress in Mission Lands* (1913) and many articles and pamphlets.

**Cape of Good Hope,** popularly regarded as the most southerly promontory of Africa, though it is half a degree to the n. of Cape Agulhas. Its importance was not realized until in 1497 Vasco da Gama rounded it on his voyage from Lisbon to Calicut.

**Cape of Good Hope,** formerly **Cape Colony,** province of the Union of South Africa. Broadly speaking, the Cape of Good Hope may be described as a series of terraces rising like steps from a narrow coastal plain and merging in the great South African tableland, only a small portion of which lies within the province. The principal mountain chain follows the coast line of the cape, attaining an average elevation of 6,000 to 8,000 ft., and culminating in Compass Berg, 8,500 ft. above the sea. Separated from it by an arid plateau, known as the Great Karroo (see KARROO), is a central chain of mountains. Still farther s. another chain, rising from the

lowland which borders the sea, follows a parallel course. The coast line is unbroken by gulfs and inlets, and there are practically no navigable rivers. Generally speaking, the climate is healthful, though the alternations of heat and cold have a wide daily range. The flora of the Cape of Good Hope is rich and varied near the coast, growing sparser toward the interior. Beautiful heaths in great variety are found about Cape Town. Forests are few, being confined to an area of 550 sq. m. on the southern slopes of the coastal hills. The wild animals of the South Afri-

ried on as well as manufacture of woolen fabrics, and leather. Other industries include harness and saddle factories, flour mills, foundries, and breweries. The native population may be divided into the Bushmen, the earliest aboriginal race, now almost extinct; the Hottentots, chiefly in the western provinces; and the great Bantu race, living in the east and n.e. of the colony, and known as Kaffirs. In addition, there are Malay, Indian, and Chinese immigrants, and descendants of Buginese imported originally as slaves by the old Dutch East India government.



*Cape Cod Canal.*

can veldt have been nearly all destroyed. Birds are numerous, the ostrich being of considerable economic importance.

The province is rich in mineral resources. The most productive diamond mines in the world are located at Kimberley and diamonds are also obtained from alluvial diggings along the banks of the Vaal. Copper is found throughout the district of Namaqualand, and there are extensive coal deposits in the Stormberg. Of the three chief industries of the Cape—mining, agriculture, and stock raising—agriculture is by far the least important, the inadequate water supply, long droughts, and sudden and severe storms combining to render crops extremely uncertain. Stock farming is carried on much more extensively than agriculture. Sheep, cattle, Angora and other goats, horses, and ostriches are raised, wool, mohair, and ostrich feathers constituting important products. The timber of the colony is suited for wagon making and for articles of furniture; and these trades have been car-

English is the language spoken officially and is the language of commerce, but Dutch or rather the peculiar South African variety of Dutch known as the *Africander Taal* is used by many. The educational system of the Cape includes all classes, European and native, and admits of a gradual progress from the third class undenominational school through second and first class schools and college. Institutions of higher learning include the South African, Victoria, Rhodes University, and Huguenot Colleges, and a number of denominational schools. Since 1872 the Cape of Good Hope has been under a responsible government, and since 1910 it has been a province of the South African Union. The Cape of Good Hope was first rounded by the Portuguese voyager and discoverer, Bartholomeu Diaz, in 1486. In 1652 the Dutch East India Company took possession, and initiated a period of monopolistic and repressive control that lasted until the end of the 18th century. British forces occupied the

colony in 1795 and again in 1806, and in 1814 it was ceded in perpetuity to the British crown.

In 1834 the emancipation of the slaves in Cape Colony provoked wide discontent among the Dutch farmers (Boers). Meanwhile, the northward advance of the British and the continual raids on the colonists' cattle made by the Kaffirs resulted in what is known as the Kaffir wars, nine in number. A new impetus to development was given by the discovery of diamonds in the districts n. of the Orange River in 1867, and of the four richest diamond mines in the world in 1870 (Dutoitspan and Bultfontein) and 1871 (Kimberley and De Beers), resulting in the annexation of the Diamond Fields. In 1881 took place the first Boer war; one of its principal results was the formation of the African Bond.

Among more recent events have been the Jameson Raid of 1895, and the Boer War of 1899-1902. Cecil Rhodes played an important part in the history of the colony, and was prime minister in 1890-6. In June, 1909, the Colony adopted the constitution framed for the South African Union, and May 31, 1910, became a province of that commonwealth. See SOUTH AFRICAN UNION.

**Bibliography.**—Consult Theal's *Records of Cape Colony* (23 vols.); Brand's *Union of South Africa* (1909); S. Playne's *Cape Colony* (1912); *Statistical Year Book of the Union of South Africa* (annual).

**Cape Pigeon**, or **Cape Petrel**, sailors' names for a big petrel (*Daption capensis*); numerous about the Cape of Good Hope.

**Capercaillie**, **Capercaillie**, **Wood Grouse**, or **Cock of the Woods** (*Tetrao urogallus*), a large game bird, widely distributed throughout Europe in the hilly pine forests.

**Cape River.** See **Segovia River**.

**Capernaum**, meaning 'the village of Nahum,' was in the time of Christ a prosperous place, and was one of the three which he upbraided 'because they repented not.' Its site has been disputed.

**Capers** are the pickled flower buds of the caper bush (*Capparis spinosa*). They have an agreeable pungency of taste. The *caper bush* is a native of the Mediterranean countries, and is cultivated in some parts of the s. of France and in Italy, but most of all in Sicily.

**Capet**, the family name of the 3d Frankish dynasty, which ruled France. The founder of the house was Hugh Capet.

**Capet, Hugh** (c. 938-996), king of

France, son of Hugh the Great, duke of Francia and count of Paris. The origin of the Capetian house is obscure. It may probably be traced to a Teutonic stock. In his early years Duke Hugh was a kind of mayor of the palace to the Caroling kings; but in 987, on the death of the Caroling Lothair, he was elected king. Hugh's reign was not remarkable. He laid, however, the foundations of a dynasty which endured uninterruptedly for more than 800 years.

**Cape to Cairo Railway**, a project, originally conceived by Cecil J. Rhodes for a great African trunk line. Kimberley was reached in 1885; the section from Kimberley to Vryburg was opened in December, 1890; and that from Vryburg to Buluwayo in 1897. At this point the Rhodesian Company began construction shortly before the outbreak of the Boer War in 1899. The first passenger arrived at Victoria Falls in 1904. Roads and steamboat service connect across the gap between completed north and south sections. Airways have decreased interest.

**Cape Town**, capital of Cape of Good Hope province, and metropolis of South Africa, is beautifully situated at the base of Table Mountain, and on the shores of Table Bay. The city is the terminus of the Cape to Cairo Railway. Cape Town was laid out by its Dutch founders with mathematical preciseness—the main thoroughfares crossing one another at right angles. The beautiful government gardens in the heart of the town serve the purposes of a public park. The town is the see of an Anglican and a Roman Catholic bishop; has fine government buildings, especially the Parliament House, and municipal buildings; the English cathedral, South African College, South African Museum and Library, Grey Library, and Botanic Gardens. The University of the Cape of Good Hope (1873) is an examining body, with affiliated colleges. The Observatory (1820) is the finest in the Southern Hemisphere. Cape Town is the seat of the legislature of the Union of South Africa, of the provincial government, and of the provincial division of the Supreme Court. It was founded by the Dutch in 1652; p. 383,891.

**Cape Verde Islands**, a group of islands belonging to Portugal, in the Atlantic Ocean, lying about 350 m. w. of Cape Verde on the w. coast of Africa. They include 10 inhabited islands—Santo Antão, São Vicente, Santa Luzia, São Nicolão, Boa Vista, Sal, Maio, São Thiago (Santiago), Fogo, and Brava—and four uninhabited islets with a total area

of 1,480 sq. m. The islands, which are volcanic in origin, are separated from one another by deep passages, and are extremely mountainous, the loftiest point being a volcanic peak on the island of Fogo, 9,157 ft. above the sea. The climate is hot and unhealthy. The flora is tropical. Coffee is the chief crop, and the physic nut (*Jatropha curcas*), maize, millet, sugar cane, manioc, indigo, oranges, pumpkins, and sweet potatoes are raised. The Cape Verde Islands are a Portuguese colony under a governor-general residing at Praia. The inhabitants are chiefly mulattoes and negroes, with some Portuguese; p. 148,300. The islands were discovered by Cadamosto in 1457.

**Cape York Peninsula**, North Queensland, Australia, separates the Gulf of Carpentaria from the Pacific Ocean.

**Capias**, ('thou mayest seize'), the short name of several writs directed to the sheriff requiring him to arrest the person named therein.

**Capillaries**. The name capillary (from *capillus*, 'a hair') is given to the minute vessels which form the connection between the terminal branches of the arteries and the commencements of the trunks of the veins.

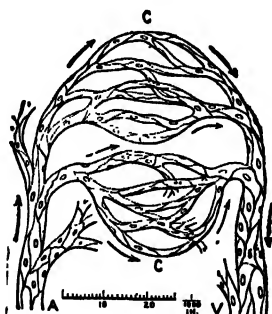
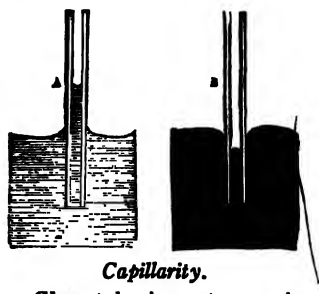


Diagram of Capillaries.

A, Artery; v, Vein; c, Capilla-

**Capillarity**. When a number of clean glass tubes of very fine bore, each open at both ends, are immersed in water, the water rises in each to a higher level than at which it stands outside, and the finer the bore the greater is the height of the water. Phenomena of this kind are called *capillary phenomena*, since they are evident in narrow, hairlike tubes only. The explanation lies in the existence of tension in the surface layers of a liquid. Many facts make the existence of this tension evident, notably the spontaneous con-

traction of liquid films, such as soap films. Now, any film which tends to contract tends to become a plane if free to do so; and if kept curved, it presses toward the concave side. Again, a liquid which rises in a capillary tube is observed to be always concave upward. Hence the pressure just below is less than the atmospheric pressure; and the atmospheric pressure is reached *inside the tube* only at some distance below the surface. But



Capillarity.

A, Glass tube in water; B, in mercury.

outside the tube, at the surface of the liquid, the pressure is atmospheric. Hence, by hydrostatic principles, the liquid must rise in the tube until the hydrostatic condition is satisfied. The reason for the water climbing up the sides of a glass tube, so as to make the surface concave upward, lies in the greater attraction of water to glass than of water to water. If in any liquid the attraction of liquid for liquid exceeded that of liquid for solid, the surface would become concave downward, and the liquid would not rise so high inside as outside the tube. This occurs, for example, in the case of mercury in a glass tube. Consult C. V. Boys' *Soap Bubbles* (new ed. 1912); Tait's *Properties of Matter*.

**Capistrano**, Giovanni di (1385-1456), Italian Franciscan preacher, born at Capistrano in the Abruzzi, and entered the Franciscan Order in 1416. He was twice vicar-general, and his eloquence won back to the church many Hussites of Moravia, and greatly contributed to deliver Belgrade from the Turks. He was canonized in 1724. His chief work is a treatise on the *Authority of Pope and Council*.

**Capital**, in architecture. See **Column**.

**Capital**, in economics, has been defined as that portion of wealth which is used to create more wealth. In common use of terms, capital has sometimes been classified as *fixed* and *circulating*. Fixed capital is embodied

in a more permanent form, and fulfils its functions by repeated use. Circulating capital, on the contrary, is continually changing its shape or ownership. Capitalism is the name applied by socialists and collectivists to that condition of society in which capital belongs to private individuals, as opposed to a welfare state in which all means of production, including both land and capital, will be publicly owned. Socialists lay emphasis on the immense power afforded by capital in the so-called exploitation of the worker, who is dependent on the labor of his hands. See **ECONOMICS**; **INTEREST**; **LABOR**; **LAND**; **ECONOMICS**; **PROFITS**. Consult E. von Böhm-Bawerk's *Capital and Interest and Positive Theory of Capital* (Eng. trans.); Karl Marx' *Capital*; Taussig's *Wages and Capital*; Mallock's *Critical Examination of Socialism*.

**Capital Account** is a statement of the resources of a company or business. The Revenue Account, on the other hand, deals with receipts obtained. See **BOOKKEEPING**.

**Capital of Corporations.** In ordinary business usage, the capital of a corporation consists of its securities, at their par value. It includes not only the various forms of stocks, but the bonds issued by the corporation as well. The capital of a corporation bears no close relation to the value of the property of the corporation. In some cases the total value of the property exceeds the aggregate capitalization, and in these the company is said to be under-capitalized. More frequently the capital exceeds the value of the property, when the corporation is said to be over-capitalized. See **CORPORATION**; **STOCK** AND **STOCKHOLDERS**.

**Capital Punishment**, that form of punishment which deprives the offender of life. The use of the capital penalty is determined generally not by the material culture of any group or state, but by the social relations between the individuals of the group. As democracy has spread, therefore, and human contacts have been facilitated by the development of means of communication, there has been a general tendency for capital punishment to wane. There were 17 capital offenses in the early part of the 15th century in England, but more than 200 in the last part of the 18th century, and it was not until 1839 that the number was as small as it had been four centuries earlier.

The methods of producing death have included beheading, hanging, burning, boiling, breaking on the wheel, strangulation, suffo-

cation, burying alive, drowning, stoning, crushing, piercing, precipitation from a height, tearing apart, and combat in an arena. Impaling and immuring were abolished in Switzerland about 1400, execution by drowning in 1615. Burning at the stake was used in Berlin as late as 1786. In England boiling to death was abolished as a method of execution in 1547, and burning in 1790. In some cases the offender was first hanged and his body was then mutilated, but the general practice in England in later days was to gibbet the body, that is, hang it to the gallows in chains, frequently after soaking it in tar, so that it would remain for a long time as a warning to others. In America there were at no time so large a number of offenses punishable by death as in England. The method of inflicting death during the colonial period was almost invariably hanging.

Efforts to secure methods that will produce death as swiftly and painlessly as possible and the tendency to exclude the public from executions show an increasing desire on the part of the people to mitigate if not entirely do away with capital punishment. In 15 States the death penalty is inflicted by electrocution; in three States (Arizona, Colorado and Nevada) by asphyxiation. In Utah the victim may choose hanging or shooting. Capital punishment is the point at which the two principal theories of criminal law meet in conflict. Evidence as to whether in the existing situation capital punishment is correlated with a lower murder rate than long-term imprisonment, is unsatisfactory. The principal arguments against capital punishment are that it lowers the general appreciation of life; it makes the victims into heroes and martyrs for other criminals; the penalty is irreparable in case of error; it has a bad effect on the morale of the institution in which the penalty is inflicted; it is inconsistent with the general policy that is being developed for the treatment of offenders; it concentrates emotions on the evil that is already done rather than on the removal of the conditions which produced the evil; it is the primary reason for delay and inefficiency in the existing courts. Consult Liepmann's *Die Todesstrafe* (1912); *Handbook on Capital Punishment, Prison Leaflets No. 38*, by the National Committee on Prisons and Prison Labor (1916); *Bulletin 25, on Capital Punishment*, of the Mass. Constitutional Convention (1917); Bye's *Capital Punishment in the United States* (1919); Lawes' *Man's Judgment of Death* (1924); Gillin's *Criminology and Penology* (1926).

**Capitals** (*majuscula*), in contradistinction to Small Letters (*minuscula*), are larger and differently shaped letters employed in writing and printing to help the eye, to relieve the uniformity of the page, to increase the facility of keeping and finding the place, to mark the beginning of sentences, proper names, etc. SMALL CAPITALS are so called as being smaller than the initial capitals. See ALPHABET.

**Capital Stock.** See **Stock and Stockholder.**

**Capito**, or **Köpfel**, **Wolfgang Fabricius** (1478-1541). German reformer, was born in Alsace. He approved of Luther's action, but nevertheless in 1519 entered the service of Albert of Mainz; and it was not till some years later that he finally declared for the Reformation.

**Capitol** (Latin *Capitolium*), the great national temple of ancient Rome, situated on the southern summit of the Capitoline Hill—*Mons Capitolinus*. On its northern summit stood the *Arx* or citadel of Rome, the site of which is now occupied by the Church of S. Maria in Araceli. The Capitol was founded by Tarquinius Priscus, and completed by Tarquinius Superbus. The modern Capitol (*Cam-pidoglio*), built on the site, and part of the basement of the ancient Capitol, was designed by Michelangelo, but is one of his inferior works. An account of the United States Capitol is given in the article on WASHINGTON; the State capitols are described in the articles on the capital cities.

**Capitoline Games**, games instituted at Rome by Camillus, 390 B.C., in honor of the preservation of the Capitol from the Gauls. After a period of discontinuance, they were again instituted as a quadrennial event by Domitian, 86 A.D.

**Capitoline Hill.** See **Capitol.**

**Capitularies**, a term applied to certain edicts issued by the Frankish kings. They are distinguished from other classes of mandates by their division into chapters and by the fact that they are attested by no seals or signatures. They attained their greatest importance under Charlemagne and Louis the Pious. They contain regulations for all departments of secular and ecclesiastical life, instructions for officials, particularly the *missi dominici*, and modifications of the old tribal law.

**Capitulation**, the act of surrendering an armed force, fortress or besieged city to an enemy upon specified terms contained in a

convention or other instrument, also known as a capitulation. Such agreements being made by virtue of an implied power confided to generals and admirals, do not as a rule require the ratification of the supreme power unless such ratification is expressly reserved in the act itself. The Brussels Conference of 1874 laid down (Art. 46) the following rules to regulate capitulations:—"The conditions of capitulations shall be discussed by the contracting parties. These conditions should not be contrary to military honor. When once settled by convention, they should be scrupulously observed by both sides." See INTERNATIONAL LAW.

**Capiz**, province, Philippine Islands, occupying the northern coast of the island of Panay. Sugar, corn, rice, indigo, hemp, chocolate, and cattle and horses are produced. Gold and iron are found, and portions are thickly wooded. The capital is Capiz, 242 m. s.e. of Manila; p. 441,871.

**Caplin.** See **Capelin.**

**Cap Martin**, a winter health resort on the Mediterranean coast of the French department of Alpes-Maritimes, situated between Mentone and Monaco.

**Capnomancy**, divination by observation of the smoke from incense or a sacrifice. Thin smoke ascending directly was interpreted as a favorable augury.

**Capodistria**, fortified seaport town of Italy, in Istria. (anc. *Ægida* and *Justinopolis*), 9 m. s. of Trieste. It is an attractive town of Venetian aspect and the Cathedral is a beautiful Gothic building with a fine campanile. The chief industries are fishing, preparing salt from sea water, and fruit growing; p. 12,000.

**Capo d'Istria**, or **Capodistrias**, **John Antonio, Count** (1776-1831), Greek political leader, was born in Corfu, studied medicine, but devoted himself to politics. He held various important positions in the Ionian Islands during their occupation by the Russians, 1802-7, and in 1827 he was elected president of Greece. His undoubted Russian bias led to popular dissatisfaction, and on Oct. 9, 1831, he was assassinated by Constantine and George Mavromichalis, brother and son of a man whom he had imprisoned.

**Cappadocia**, a division of Asia Minor, varying in extent at different periods in its history. After 560 B.C. it became part of the Persian Empire and remained so until about 330 B.C., the time of Alexander's conquests. For a time it belonged to the Syrian kingdom, and was then governed by independent kings.

On the death of King Archelaus at Rome, A.D. 17, the Emperor Tiberius made it a Roman province.

**Cappon, James** (1855-1939), Canadian writer and educator, was born in Dundee, Scotland. He is one of the editors of the *Queen's Quarterly Magazine*. His published works include: *Britain's Title in South Africa*, *Studies in Canadian Poetry*, Charles G. D. Roberts (1924).

**Capponi, Gino, Marchese** (1792-1876), Italian statesman and historian, was born in Florence. After traveling for a time in England, he settled in his native city and founded the *Antologia Italiana*, modelled upon the *Edinburgh Review*, and later the *Archivio Storico Italiano*. Although he had become blind, he assisted in the preparation of the improved edition of Dante's *Commedia*. His most important work is *Storia della repubblica di Firenze*.

**Capps, Edward** (1866-1950), American educator, was born in Jacksonville, Ill. He was American Red Cross Commissioner to Greece in 1918-19, and Envoy Extraordinary and Minister Plenipotentiary to that country in 1920-21. Among his numerous publications on the classics are: *From Homer to Theocritus*; *Chronological Studies in the Greek Tragic and Comic Poets*; *The Plot and Text of Menander's Epitrepotes*.

**Caprera**, ('goat island'), a bare, rocky island off the n.e. coast of Sardinia. It has an area of about 10 sq. m. and is connected with the island of La Maddalena by a swing bridge. It was the favorite residence of Garibaldi during the last thirty years of his life, and there he died in 1882. His home, Casa Bianca, has been arranged as a museum.

**Capri**, Italian island, in the Bay of Naples, is a favorite resort of foreigners as well as of Neapolitans. Features of interest are the Blue Grotto, a cavern entered by a low, narrow opening from the sea, filled with a strange blue light; the villas of Tiberius now in ruins; a ruined castle; and the Arco Naturale, a fantastic archway in the rocky cliffs. Capri and Anacapri are the principal towns. Capri was undoubtedly inhabited in prehistoric times. It was once Greek, and later Roman, being long the home of Tiberius; p. 6,858.

**Capriccio**, or **Caprice**, in music, a form of composition not governed by any set rules. The term is also applied to a painting or engraving made under like conditions.

**Capricornus**, an ancient constellation, and the 10th sign of the zodiac, that of the win-

ter solstice. It was celebrated among the ancients as a harbinger of good fortune.

**Caprification**, a process of pollination essential to the development of the Smyrna fig, consisting in the transfer of pollen from the wild fig or caprifig, known also as the male fig, by a small insect, *Blastophaga grossorum*. The pollen-laden insect crawls from the caprifig to the Smyrna fig, and fertilization ensues. Caprification has been successfully introduced into California.

**Caprifoliaceæ**, the Honeysuckle family, a family of annual and perennial herbs, shrubs, and trees, of wide distribution. Among the genera are Lonicera, Linnaea, and Viburnum.

**Caprivi de Caprara de Montecuculi, Count Georg Leo von** (1831-99), German Chancellor, was born in Charlottenburg. He served with distinction in the Danish and Austrian campaigns; and in the Franco-German war of 1870 he acted as chief of staff to the 10th Army Corps. On Bismarck's retirement, in March, 1890, General von Caprivi became Imperial Chancellor and Minister for Foreign Affairs. In 1894, he suddenly resigned, owing to friction with Count Eulenberg on the question of the Agrarian League malcontents.

**Caproic Acid** is known in eight isomeric forms. Normal caproic acid,  $C_6H_{11}COOH$  is one of the products of the butyric fermentation of sugar.

**Capsella**. See **Shepherd's Purse**.

**Capsicum**, a genus of tropical shrubs belonging to the order Solanaceæ, including about 90 species, all indigenous to tropical America. The fruits are dried and exported as capsicums, chillies, or, when powdered, as cayenne pepper. The green fruits are sometimes pickled and are used for making chilli vinegar. When used with meat they form the Mexican 'tamale.'

**Capstan**, a machine for raising heavy weights, especially on shipboard. A ship's capstan was formerly a massive column of timber, cylindrical in form but smaller at the center than at either end, and having its upper part pierced with holes to receive the bars or levers. It worked on a spindle fastened to the deck below, and was used for winding a cable in or out, or for hoisting heavy cargo or masts. In modern ships electrically-driven capstans are generally used, but much of the work formerly done by upright capstans is now performed by means of steam winches with a horizontal axis.

**Capsule**, in botany, the name given to



those fruits which, when they are ripe and dry, open to allow the seeds to drop out. See FRUIT.

**Capsule**, in anatomy, the membranous covering surrounding such organs as the spleen and kidney.

**Captain**, a military officer holding intermediate rank between a first lieutenant and a major in the U.S. Army. The captain is responsible for the appearance, instruction, drill, discipline and efficiency of his command; for the care and preservation of its equipment; and for the proper performance of duties connected with its subsistence, pay, clothing, company funds, accounts, reports, returns, etc. A captain in the U.S. Navy has the assimilated rank of colonel in the army, and his corresponding command is a war vessel, senior captains generally commanding battleships, and those lower on the list vessels of various classes. A naval captain's duties in reference to his command are similar to those of an army captain, but involve a far higher degree of responsibility for life and property.

**Caption**, the title or heading of a legal paper, designed to show the authority by which it is issued. It is used in indictments, depositions, etc., but is no part of the indictment itself.

**Capua**, town and episcopal see, Italy, in the province of Caserta. The chief features of interest are the cathedral, founded in 856 but with the exception of the beautiful campanile almost entirely rebuilt; p. 9,832. The ancient city of Capua, once a rival of Rome, and long famous for its luxury, was founded by the Etruscans. After being devastated successively by Goths, Vandals, and Longobards, the city was finally destroyed by the Saracens in 840; the modern city was founded about 16 years later. In 1860 Garibaldi and his forces defeated the Neapolitans outside Capua.

**Capuana, Luigi** (1839-1918), Italian novelist and critic, was born in Mineo in Catania (Sicily). As a novelist he ranks among the foremost realists, his best-known work being *Giacinta* (1879). Other works include two charming volumes of fairy tales, one of which, *C'era una volta* (1882) has been translated into English (*Once upon a Time*, 1892).

**Capuchin Monkey**, or **Sapajou**, a name sometimes restricted to *Cebus capucinus*, sometimes applied generally to the whole genus *Cebus*, because of the cowl-like appearance of the hair on the forehead. All the species are restricted to tropical America, and are the monkeys most often seen in travelling

shows and accompanying itinerant organ players. See MONKEYS.

**Capuchins**, a branch of the Franciscan friars, founded about 1525, by Matteo da Bassi, who advocated a return to the observance of the most rigid rules of St. Francis. In 1528, Pope Clement VII. issued a bull authorizing them to wear the pyramidal hood (*capuccio*), to go barefoot, to grow beards, and to live as hermits. See also FRANCISCANS.

**Capulets**, a noble family of Verona (Italian Capelletti), which with the Montagues (Montecchi) figures in Shakespeare's *Romeo and Juliet*. The story of the feud between the families and the love of Romeo and Juliet seems to have been widely current in the 16th century, and it probably was from Arthur Brooke's versified translation (1562), through the French, of Bandello's Italian novel, that Shakespeare drew his plot.

**Capybara**, or **Carpincho** (*Hydrochaeris capybara*), the largest living rodent, allied to the cavies and the guinea-pigs, and found only in South America.

**Caraballos Occidentales**, one of the three great mountain ranges of Luzon, Philippine Islands.

**Carabao**, the domesticated water buffalo of the Philippine Islands. It is used by the natives for drawing carts and carrying burdens as well as in ploughing and other farm-work.

**Carabidae**, a family of beetles, which includes all the common ground beetles, numbering some 12,000 species. They are to be found under stones and fallen logs, in gardens, woods, and fields.

**Carabinieri**, or **Carbineers**, originally mounted French soldiers armed with carbines. In the British army the name is applied to the 6th Dragoon Guards; in Italy the gendarmerie are known as carabinieri.

**Carabobo**, state, Venezuela, in the northern part, extending from the sea inland; area 2,984 sq. m. The southern part is densely peopled, and produces excellent coffee, fruit, sugar, maize, rubber, and dyewoods. The capital is Valencia; p. 125,514.

**Caracal**, **Caracul**, or **Persian Lynx**, a small carnivore of the cat family found widely distributed throughout Southern Asia and Africa. It is a handsome animal, bright reddish brown above and paler below, with black ears and a long tail.

**Caracalla**, (188-217), emperor of Rome from 211 to 217, was a son of Septimius Severus. He built at Rome the famous Thermae

Caracallæ, the ruins of which are still extant.

**Caracara**, the name given to various vulturelike, carrion-eating hawks of Central and South America.

**Caracas**, town, capital of Venezuela; 8 m. s. of its port, La Guaira. Features of interest are the capital, a large building in semi-



*Caracal.*

Moorish style; the episcopal palace; the cathedral; and residence of the president, the Yellow House. A statue of Simon Bolivar stands in the Plaza Bolivar. The leading industrial establishments are breweries, furniture and tobacco factories, and foundries. Exports include coffee, cocoa, and tobacco; p. 487,903.

**Caracciolo**, Prince Francesco (1752-99), admiral of the 'Parthenopeian Republic,' which succeeded the kingdom of Naples in 1799.

**Caractacus**, son of Cunobelinus, a king of the Silures in Britain, made a vigorous resistance to the Romans during the reign of Claudius. Betrayed to the Romans, he was taken to Rome to grace the triumph of Claudius, and appears to have ended his days in Italy.

**Caracul**. See **Caracal**.

**Caraffa**, a noble Neapolitan family, three members of which, Carlo (1519-61), Antonio (1538-91), and Giovanni, were entrusted with the temporal administration of church affairs.

**Caraman**. See **Karamania**.

**Carambola**, known also as the **Coromandel Gooseberry**, a small evergreen tree, cultivated in India for its edible fruits.

**Caramel**, the brown or black substance produced by heating sugar over a slow fire; is largely used in coloring wine, beer, candy, ice cream, and other articles.

**Carapa**, a genus of tropical trees, of which the best known is *C. guianensis*, a native of

Guiana. It has pinnate leaves and bears fruit as large as oranges, with a characteristic sub-acid flavor; its seeds yield a thick oil used in lamps. From an African species (*C. procera*) an oil is obtained with which the natives anoint the body to protect it against insects.

**Carat**, (1) a unit used in weighing gems. The United States and many other countries now use the metric carat of 0.2 gram, or about 3.1 troy grains. (2) The proportion of pure gold in an alloy, expressed as twenty-fourths of the whole. Thus, 18-carat gold is 18-24 pure gold.

**Carausius**, Marcus Aurelius Valerius (?250-293 A.D.), Roman general, a native of Menapia (Belgium), who distinguished himself in Gaul. Made himself master of Britain. He was assassinated by one of his officers, Allectus.

**Caravaca**, town, Spain, in the province of Murcia. The parish church contains a sacred cross famed for its healing powers, in honor of which a yearly festival is held; p. 20,645.

**Caravaggio**, Michelangelo Amerighi da (1569-1609), Italian painter, was born in Caravaggio, near Milan. He has been called the founder of the Naturalistic School. Among his best works are *Christ and the Two Disciples at Emmaus*; *Martyrdom of St. Peter*; *The Entombment*.

**Caravaggio**, Polidoro Caldara de (c. 1492-1543), Italian painter, was born in Caravaggio near Milan. His greatest picture, *Christ bearing the Cross*, is now in the museum of Naples.

**Caravans**, the name given to travelling companies of traders or pilgrims in the Far East, especially those crossing the deserts of Asia and Africa. The rise of Islam in the 7th century led to the institution of the annual pilgrimage to Mecca, and devout Moslems make up the most celebrated caravans of the present day, while the roads from Basra, Suez and Bagdad to Mecca are among the most important caravan routes.

**Caravansary**, or **Caravanserai**, the unfurnished inns of the East which from earliest times have served as resting places for caravans. Some are maintained by the government, others by private individuals or in connection with mosques. Some offer free accommodation and others make a small charge.

**Caravel**. See **Carvel**.

**Caraway**, an annual herb belonging to the order Umbelliferae, about two ft. high, with a much-branched stem, and umbels of white flowers in June. It is cultivated chiefly for its seeds, which are used for flavoring. From

the seeds, also, an oil is distilled which is used in medicine, as a stimulant and carminative.

**Carbides**, compounds of carbon with other elements, principally metals. Calcium carbide,  $\text{CaC}_2$ , is manufactured on a large scale by heating coke with lime in the electric furnace. It is a crystalline compound from which acetylene ( $\text{C}_2\text{H}_2$ , hydrogen carbide, and, theoretically at least, hydrocarbic acid)



*Caraway.*

1, Flower; 2, Fruit; 3, Section of Fruit.

is obtained, for illuminating and heating purposes, by the action of water. Similar carbides are obtained from analogous metals, but these also yield other gases, as methane, ethylene, and hydrogen, as well as acetylene. Of the non-metals, silicon yields silicon carbide, or carborundum,  $\text{SiC}$ .

**Carbohydrates**, a term applied to a large group of compounds containing carbon, hydrogen, and oxygen, the last two being in the proportion of two atoms of hydrogen to one of oxygen, as in water. They include (1) the aldehyde-alcohols, such as tetrose and arabinose; (2) glucoses, such as dextrose or grape-sugar, lævulose or fruit-sugar, galactose, and sorbinose; (3) saccharoses, such as cane-sugar, maltose, milk-sugar, and raffinose; and (4) amyloses, of more complex constitution, such as starch, cellulose, dextrin, glycogen, and gums. Carbohydrates are important constituents of plant and animal life. They play an exceedingly important role in diet, two-thirds of the energy produced in the living organism being due to their oxidation. See **DIET AND DIETETICS**; **FOOD**.

**Carbolic Acid, Phenol, or Hydroxy Benzene** ( $\text{C}_6\text{H}_5\text{OH}$ ), is a white crystalline solid derived from coal tar and largely used as a disinfectant and germicide, as a raw material in the manufacture of certain medicinal products, dyes and explosives, and as a constituent of synthetic plastics such as bakelite. It is neutral to test paper, and has more in common with the alcohols than with the acids. It is prepared from the fraction of the coal-tar distillate which comes over between  $150^\circ$  and  $200^\circ$  c. After rectification, this constitutes the crude carbolic acid used for disinfecting purposes. By careful purification it can be obtained pure. Carbolic acid is readily soluble in alcohol, ether, chloroform, glycerine, olive-oil and vegetable oils. In solution, carbolic acid coagulates albumin, arrests fermentation, destroys parasites, whether animal or vegetable, and prevents putrefaction. These properties have led to its use as an antiseptic and a disinfectant. If taken internally, carbolic acid acts as a caustic poison.

**Carbon** (C, 12) is an element widely distributed in nature—being found free as diamond and graphite, and in an impure state as coal; in combination it occurs in carbon dioxide, in all carbonates, as limestone and dolomite, and as an essential constituent of all living things. More than 200,000 different compounds of carbon are known, far more than of any other element. The three naturally occurring varieties of carbon are of considerable value industrially, but a number of other varieties are also commercially useful. If material containing carbon be burned in a sufficient amount of air, the final form of the carbon is carbon dioxide; if less air be admitted, carbon monoxide is formed; if still less air be present, it is easily possible to burn away the other elements having volatile oxides and leave a part of the carbon in a comparatively pure form. In this way charcoal and coke are made in large quantities from wood and soft coal, and lamp black and gas black from petroleum and natural gas.

Except coke, these prepared carbons have valuable absorbent and decolorizing properties, which can be considerably increased by special methods of preparation (activated carbon). Carbon, like several other of the elements, exists in allotropic forms. This is proved by the fact that not only can one form be changed into another, but also that all kinds burn in oxygen, and from equal weights yield the same weight of carbon diox-

ide— $C + O_2 = CO_2$ . All the forms are solid, and volatilize without melting at the temperature of the electric arc. The various forms are insoluble in any ordinary solvent, but dissolve in melted metals, such as iron, from which they crystallize, on cooling, in the form of graphite. If the cooling is made to take place under very great pressure, some of the carbon is obtained in the form of minute diamonds. The diamond is an exceedingly hard, somewhat brittle, solid, colorless, transparent, and highly refractive stone when pure, crystallizing in regular octahedra (sp. gr. 3.5). Unlike other varieties of carbon, it is a non-conductor of electricity, and is converted into graphite when strongly heated, in the absence of air. Graphite (black lead or plumbago), besides occurring naturally, is prepared by heating anthracite coal in the electric furnace. It is a soft, greasy-looking, black solid (sp. gr. 2.25) that crystallizes in six-sided plates. Its chief use is in lubricants, in contact brushes for electrical machinery, as a constituent of some metal paints, as the 'lead' in pencils, and as the electrodes used as conductors in certain electro-chemical and electro-metallurgical processes. The other varieties of carbon are amorphous, depending for their appearance on the way in which they are prepared. Thus, charcoal is soft, black, and porous, resembling the wood from which it is obtained. Amorphous carbons prepared from gas and oil are used in rubber manufacture and as pigments in black paints and printing ink. Coke and charcoal are largely used as fuel in the recovery of iron and other metals from their ores and to some extent as smokeless domestic fuels.

Chemically, carbon is unique in forming an almost infinite series of compounds—a fact that is due to its nearly unlimited power of uniting atom to atom to form open or closed chains, other elements being attached throughout the length of the chain.

Carbon dioxide ( $CO_2$ ), also known as carbonic acid gas, is a compound of carbon and oxygen. It occurs in the air and in natural waters, some of the latter being highly charged with it. It is formed when any material containing carbon is burned, and being produced by the oxidation of food-stuffs, is also expired by animals. Commercially it is prepared in huge quantities, for carbonating beverages, by the burning of coke, and as a by-product in the manufacture of epsom salt by treating dolomite with sulphuric acid. Large quantities of carbon dioxide are

evolved in the fermentation of sugar to alcohol, an important commercial source. It is formed in the operation of most portable fire extinguishers by the action of sulphuric acid on sodium bicarbonate solution. The use of solid carbon dioxide as a commercial refrigerant has been demonstrated to be economical and is rapidly increasing. Known as dry ice, it is almost indispensable in modern ice-cream and food storage industries. It helps drill oil wells, makes shatter-proof glass, cures warts, and freezes nerves in minor surgery.

*Carbon monoxide* (CO), is not ordinarily present in nature, and is formed by the combustion of an excess of carbon in oxygen; carbon dioxide being probably first formed, and then reduced to carbon monoxide,  $C + O_2 = CO_2$ , and  $CO_2 + C = 2CO$ . It is exceedingly poisonous, the inhalation of a single litre being sufficient to cause death—the carbon monoxide combining with the red coloring matter of the blood, and preventing it from carrying the necessary oxygen to the tissues. Technically, carbon monoxide is extensively used as a fuel. It is present in ordinary coal gas, and is largely prepared mixed with nitrogen, under the name of 'producer gas' by drawing air through heated coal, and as 'water gas' by blowing steam through red-hot coke, when a mixture with hydrogen in equal volumes is obtained. Since carbon monoxide is a product of incomplete combustion it is present to an appreciable degree (8 parts to 100) in the exhaust gas of automobiles. Airtight garages have increased alarmingly deaths from CO poisoning. Black smoke from a burning building contains 1 part in 1000 of carbon monoxide, one of the fireman's hazards. Its presence in illuminating gas is a danger to the housewife and miners know it as the dread white damp. It is heavy, clinging to the ground, colorless and odorless.

*Carbon disulphide*, or carbon bisulphide ( $CS_2$ ), does not occur naturally, but is prepared by passing the vapors of sulphur over strongly heated coke or charcoal— $C + S_2 = CS_2$ . The sulphur is melted, and flows to the bottom of a vertical cast-iron or clay retort, which is heated by an external fire, or internally by electric arcs or resistances. As a result the sulphur is vaporized and combines with the hot carbon, the carbon disulphide formed being led off through cooled pipes and condensed. It is afterwards purified by distillation. Technically, carbon disulphide is used to dissolve oils, fats, waxes,

resins, etc., and as a solvent for sulphur chloride in vulcanizing rubber. It is employed as an insecticide, particularly for killing weevils in grain, but must be used with great caution. It is sometimes used to destroy rats and other small burrowing animals in their holes.

**Carbon tetrachloride** ( $\text{CCl}_4$ ), or tetrachloromethane, is prepared by the action of chlorine on carbon disulphide. Because of its non-inflammability and great solvent powers, it is used as a cleansing agent, either alone or mixed (60 pts. to 40) with gasoline, which mixture is also non-inflammable. It is also used in large quantities in the extraction of oils from seeds, as a solvent for rubber and other gums, and to an even greater extent as a fire extinguisher under the trade name, 'pyrene.' See also CHEMISTRY; CARBIDES; CARBONATES; HYDROCARBONS.

**Carbonari**, an Italian secret political society formed early in the 19th century to resist the misgovernment of the Bourbon princes in Naples and to secure Italian freedom and unity.

**Carbonated Waters** (Soda Water, Vichy, Seltzer, Aerated Water), a term applied to a large class of beverages which are rendered sparkling and effervescent by dissolving carbon dioxide in them under pressure. The release of the pressure permits evolution of the dissolved gas, thus causing effervescence.

Carbon dioxide for use in beverages is obtained from three commercial sources: the burning of coke in the air; the fermentation of sugar into alcohol by yeasts; as a by-product from certain industrial operations involving the treatment of a carbonate by an acid.

**Carbonates**, the salts derived from the hypothetical dibasic carbonic acid,  $\text{H}_2\text{CO}_3$ ; they are of three varieties—normal, acid, and basic—all of which are decomposed by most dilute acids with the evolution of carbon dioxide. The normal carbonates, in which both hydrogen atoms of carbonic acid have been replaced by a metal, are, as a rule, crystalline solids. Calcium carbonate (calc-spar, limestone) and sodium carbonate (washing soda) are typical examples. The acid carbonates or bicarbonates, are decomposed with evolution of carbon dioxide on heating to the temperature of boiling water. Sodium bicarbonate is an example of this class. The basic carbonates, which may be looked on as formed by the incomplete neutralization of the base by carbonic acid, are complex, and have been but little investi-

gated; white lead  $\text{Pb}(\text{OH})_2\cdot\text{PbCO}_3$ , may be taken as typical.

**Carbondale**, city, Illinois, county seat of Jackson co. The Southern Illinois Teachers' College is situated here; p. 10,921.

**Carbondale**, city, Pennsylvania, Lackawanna co.; contains some of the oldest mines and most extensive deposits of anthracite in the country; p. 16,296.

**Carbone, Tito** (1863-1904), acquired celebrity by his work confirming the causative organism of Mediterranean or Malta fever.

**Carboniferous**, one of the great periods or divisions of the Paleozoic Era in geology.

The Carboniferous system overlies the Devonian and is succeeded or completed by the Permian. It falls naturally into two great subdivisions—a lower, known as the Mississippian, including great thickness of limestones, shales and sandstones, but poor in workable coal; and an upper series, known as the Pennsylvanian, and containing many valuable seams of coal. The Carboniferous series of rocks is highly developed in the Pennsylvania region, the central Mississippi Valley, and in certain districts of the Rocky Mountain region. In the Mississippi Valley the Lower series includes the Chester, St. Louis, Osage and Kinderhook stages, represented by great development of limestones up to 15,000 ft. in thickness. The Carboniferous in the United States covers over 200,000 sq. m. and is extremely rich in coal in both the eastern and Mississippi Valley regions. In the southern hemisphere a very different facies prevails in the Carboniferous. The Lower Carboniferous of Australia contains the same genera of fossils as the English Carboniferous; but the Upper or Permo-Carboniferous strata, which include many seams of coal, are distinguished by the presence of a flora, of which the most prominent member is the fern *Glossopteris*. This *glossopteris* flora occurs also in India and South Africa, and the beds which contain it are relegated to a later period than the American or English Coal Measures.

In plants the Carboniferous is exceedingly rich: they are mostly ferns, conifers, lycopods, and Equisetaceæ. The highest animals were reptiles and giant amphibians (*Labyrinthodonts*). Fishes abounded, principally ganoids and sharks; and in the limestones all kinds of marine life are abundantly represented—corals, crinoids, blastoids, brachiopods, molluscs, worms, Polyzoa and Foraminifera being the most common. The life

of no other paleozoic period is so well known. See COAL, *Geology*.

**Carbon Monoxide**, or **Carbonic Oxide**. See **Carbon**.

**Carbon Print**. See **Photography**.

**Carbonyl Dichloride**. See **Phosgene Gas**.

**Carbon Paper**, tissue paper chemically treated so as to produce copies of an original manuscript.

**Carborundum**, a carbide of silicon, SiC, prepared by heating sand with coke in an electric furnace. A little salt and some sawdust are usually added to the mixture to facilitate the operation of the furnace. It is extremely hard and is used for abrasive purposes, making an excellent substitute for emery or corundum.

**Carboxyl**. See **Acids**.

**Carbuncle**, a name given to almandine or crimson garnet, when cut with a rounded, smooth surface. See GARNET.

**Carbuncle**, a circumscribed gangrenous inflammation of skin and subcutaneous tissue, similar to a very large boil, but far more serious because of its size.

**Carbureter**, the apparatus in motor-car and oil engines in which oil is converted into gas, and by the admission of a regulated supply of air becomes an explosive mixture. See GAS MANUFACTURE; OIL AND GASOLINE ENGINES; MOTOR CARS.

**Carcajou**, the French-Canadian name of the wolverine.

**Carcano, Guilio** (1812-84), Italian poet and novelist. One of his principal achievements was an Italian translation of Shakespeare.

**Carcassonne**, town, France, capital of the department of Aude, 55 m. s.e. of Toulouse. The old town is notable as offering a remarkably fine example of military architecture of the 11th to the 13th century. p. 33-974.

**Carcel Unit**, the flame standard officially adopted in France for gas testing; it is equal to 9.615 international candles.

**Carcinoma**. See **Cancer**.

**Cardale, John Bate** (1802-77), one of the founders and the first apostle of the Catholic Apostolic Church.

**Cardamine**, a genus of the mustard family. Most species grow along watercourses and in wet places, but a few, like the Alpine bittercress, are found on rocks and mountain summits.

**Cardamom**, the dried capsule of a herbaceous plant known as *Elettaria cardamo-*

*mum*, a native of the coast of Malabar, India.

**Cardamom Hills**, range of hills (alt. 2,000-4,000 ft.) in Travancore state, Madras, India, so-called because of the large quantities of cardamoms cultivated and gathered there.

**Cardanus**, or **Cardan** (1501-76), Italian philosopher, mathematician, and astrologer. He wrote the *Ars Magna* (1545), which contains a formula for the solution of certain kinds of cubic equations known as Cardan's formula.

**Cardboard**. See **Pasteboard**.

**Cardenal, Peire** (d. 1306), Provençal troubadour, flourished about the beginning of the 13th century.

**Cardenas**, seaport, Cuba, in the province of Matanzas, on the northern coast, contains a statue of Columbus presented by Queen Isabella II.; is an important port for the shipment of sugar and tobacco; p. 37,059.

**Cardia**, the esophageal orifice of the stomach.

**Cardialgia**. See **Heartburn**.

**Cardiff**, seaport in Wales, capital of Glamorganshire, is situated on the Taff River, 2 m. from its mouth. Notable buildings are Cardiff Castle, built about 1090, now the property of the Marquis of Bute; University College of South Wales; the Welsh National Museum; and St. John's Church. Cardiff owes its prosperity chiefly to its splendid docks; p. 243,627.

**Cardigan, James Thomas Brudenell**, seventh earl of (1797-1868), was born at Hambledon, Hampshire. In the Crimea he commanded the Light Brigade at Balaklava (1854).

**Cardiganshire**, maritime co., on the w. coast of Wales, with an area of 443,189 acres.

Cardiganshire is rich in antiquities, including ancient British fortifications, stone circles, cromlechs, and inscribed stones. There are also remains of several mediæval castles (Aberystwith, Cardigan, etc.) and monastic buildings (Strata Florida), besides interesting examples of ecclesiastical architecture; p. 53,267.

**Cardinal**, one of the body of senators of the Church of Rome who act as the Pope's counsellors, constitute the Sacred College, and, in dignity and influence, are second only to the Pontiff himself. Its members are appointed by the Pope; at his death, assembled in conclave, they elect his successor, usually from among their own number, and during the period intervening one of

them administers the affairs of the church. See CAMERLENGO. The number of cardinals is not allowed to exceed seventy, of which not more than six are called 'bishops' and occupy the suburban sees of Rome, while of those described as 'priests' the maximum number is fifty, and of 'deacons' fourteen.

Cardinals wear a red dress and red cap, and have also a red cardinal's hat, which they must receive in Rome from the hands of the Pope. This hat is never worn after the Consistory at which it is bestowed. The first American cardinal was John McCloskey, archbishop of New York, created in 1875. Later appointments were William O'Connell (1911-44), Denis J. Dougherty (1921- ), Patrick J. Hayes (1924-38), George W. Mundelein (1924-39), John J. Glennon (1945-46), Edward Mooney (1945- ), Francis J. Spellman (1945- ), Samuel A. Stritch (1945- ).

**Cardinal Bird, Red Bird, or Virginian Nightingale**, a handsome North American grosbeak. The male is a beautiful red marked with black and adorned with a tall crest.

**Cardinal Virtues**, according to Plato and other Greek philosophers, were justice, prudence, temperance, and fortitude.

**Cardiograph**, an instrument which records the movements of the heart by tracing, for the purpose of physiological and pathological research.

**Cardioid**, a heart-shaped curve which may be considered the path of a point on the circumference of a circle which rolls on another circle of equal size.

**Cardoon**, a thistle-like plant closely allied to the artichoke, but taller and more prickly, sometimes reaching a height of eight or ten feet.

**Cardozo, Benjamin Nathan** (1870-1938), Associate Justice of the United States Supreme Court by appointment of President Hoover in 1932. Born in New York City he received a master's degree from Columbia University at the age of 20 and was admitted to the bar in 1891 though he never had attended a law school. He was elected to the New York State Supreme Court as a Democrat in 1913, remained on that bench only one month and was elevated to the State Court of Appeals, of which he became Chief Judge before appointment to the highest Federal bench.

**Cardross**, village, Scotland, in Dumbartonshire, on the Clyde. At Cardross Castle, Robert the Bruce died, on June 7, 1329; p. 11,609.

**Cards, Playing**. The earliest mention of distinct series of cards occurs in the household accounts for 1392 of Charles VI. of France. In an edict (1397) of the provost of Paris, working-people are forbidden to play certain games on working days, and among these cards are mentioned. Early in the 15th century the manufacture of cards had become established in Germany, by 1425 in Italy, and before 1463 in England. In America they were brought over by the colonists. The earliest cards used in Britain were hand-painted. The court cards were then king, chevalier, and knave, the queen being subsequently introduced in place of the chevalier. The pips were first, in German cards, hearts, bells, leaves, acorns; next came especially on Italian cards, swords, batons, cups, money. In the 16th century the French adopted those now common in Britain—to wit, hearts, clubs, spades, and diamonds.

**Carducci, Giosuè** (1836-1907), Italian poet and winner of the Nobel Prize for Literature in 1906; was born at Valdicastello; wrote the universally celebrated *Hymn to Satan*.

**Cardwell, Edward, Viscount** (1813-86), English statesman, was born at Liverpool. In 1871-2 he carried out a great scheme of army reform.

**Care Sunday, Carle Sunday, or Carling Sunday**, the Sunday previous to Palm Sunday, is the Scottish name for Passion Sunday.

**Careme**. See **Quadragesima**.

**Carême, Marie Antoine** (1784-1833), French cook, was born in Paris; became cook first to Talleyrand, afterwards to the Prince Regent (George IV.) of England, and the Empress of Russia and of Austria.

**Carew, Thomas** (1594-1639), English poet and courtier. He belonged to the poetic circle that gathered round Ben Jonson.

**Carex**, a genus of perennial grasslike herbs frequenting the water-side, mostly in temperate climates.

**Carey, Henry**, (?1690-1743), English poet and musician, is believed to have been the illegitimate son of George Savile, Marquis of Halifax. His best-known poem is *Sally in our Alley*.

**Carey, Henry Charles** (1793-1879), American political economist; published *An Essay on the Rate of Wages* (1835); *The Credit System in France, Great Britain, and the United States* (1838).

**Carey, Matthew** (1760-1839), Irish-American publisher and writer on political

economy, was born in Ireland. He was successively connected with the *Freeman's Journal* (1781), the *Volunteer's Journal* (1783), and the *Pennsylvania Herald*. With Bishop White and others he founded (1796) the first

ing *Barbara Heathcote's Trial* (1871), *At the Moorings* (1904).

**Carey, William** (1761-1834), English missionary, was born at Paulerspury, Northamptonshire. Chosen as the first Baptist



Playing Cards: Early Colored Specimens

American Sunday-school society. He wrote a number of pamphlets on current questions. His *Autobiography* appeared in the *New England Magazine* (1833-4).

**Carey, Rosa Nouchette** (1840-1909), English writer of stories for girls; born in London; produced about 30 novels, includ-

missionary to India (1793), studied the Bengali dialects, and preached in the vernacular in 1795. He published Marathi, Sanskrit, and portions of the Bible in about forty Oriental languages.

**Cargill, Donald or Daniel** (1619-81), Scottish Covenanter, was born at Rattray,



Perthshire; took part with Richard Cameron in the Farquhar declaration (June 22, 1680).

**Cargo.** See **Bill of Lading; Charter-party; Freights, Ocean; Insurance.**

**Carhart, Henry Smith** (1844-1920), American physicist, born at Coeymans, N. Y., his text-books include *Primary Batteries* (1891), and *Electrical Measurements* (1895).

**Caria**, the s. w. region of Asia Minor. The coast was largely occupied by Greek colonists: in prehistoric times the interior was held by the Leleges; later, by the Carians proper, a race akin to the Lydians. Alexander the Great conquered the country in 334 B.C. Under the later Roman republic the pirates of Caria and Cilicia were notorious; they were suppressed by Pompey in 66 B.C.

**Caribbean Sea**, division of the Atlantic Ocean, from which it is separated by the West India islands, while on the s. it is enclosed by Venezuela and Colombia, and on the w. by the Central American states and Mexico. At the n.w. it connects with the Gulf of Mexico through the Yucatan Strait. A broad submarine plateau, between British Honduras and Jamaica, divides it into two deep basins. In many respects the Caribbean Sea resembles the Mediterranean, both, for instance, filling primitive depressions of the earth's crust, and both being inland seas.

**Caribee Islands**, the name given to the chain of West India islands: Saba, St. Eustatius, St. Christopher, Nevis, Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, and Grenada. See **WEST INDIES**.

**Caribou.** The American name, derived from an Indian language, of the reindeer of North America. They occur throughout the wooded districts of Canada and somewhat within the northern boundaries of the United States, in Maine and near Lake Superior. See A. J. Stone in Whitney's *The Deer Family* (1903); and E. Ingersoll, *Life of Mammals* (1906).

**Caribs**, S. American Indians, whose original home has been traced to the head-waters of the Xingu and other southern affluents of the Amazon in Central Brazil. Carib communities are still found scattered over a large area from Trinidad to Central Brazil.

**Caricature**, a representation, usually pictorial, in which the salient characteristics of a person or persons are made ludicrously prominent. The discovery of printing gave an immense impetus to this phase of art. It

is in the 15th century, therefore, that the real efflorescence of caricature in Europe begins, especially in connection with the names of Holbein and Cranach. And just as the early Christians were caricatured in Pompeii on account of their religion, so we find Martin Luther and his fellow-reformers satirized in this way as the preachers of new ideas, though not of a new religion. The end of the same century saw the birth of Jacques Callot, who is usually included among caricaturists on account of his keen satirical humor and the intense vivacity of his figures, which, however, are not strictly caricatures. In the 18th century genuine caricature had reached its full growth, and Hogarth was its unsurpassable exponent. Linley Sambourne, E. T. Reed, Harry Furniss, the late Phil May, and F. C. Gould (*Westminster Gazette*) are all caricaturists in the strictest sense; and George du Maurier, whose name, like theirs, is chiefly associated with *Punch*, may also be grouped with them. American caricature, in the broadest sense, began with Thomas Nast, whose pictures in *Harper's Weekly* in 1868, 1869, and 1870 did much to bring about the destruction of the Tweed Ring. Nast's immediate successors were Keppler and Gillam. By the end of the 19th century caricature, both political and social, had become a strong feature of American journalism.

**BIBLIOGRAPHY.** See Wright's *Caricature Under the Georges* (1875); Berger's *My Victims; How to Caricature* (1952); and Hoff's *It's Fun Learning Cartooning* (1952).

**Caries** is a condition in bone corresponding to ulceration of soft parts. It is peculiar to spongy bone, and is found mostly in the spinal vertebrae, in the shaft of the long bones, and in the short bones of the wrist and ankle. The teeth also undergo caries, but this is neither syphilitic, tubercular, nor suppurative as is caries elsewhere. In *caries necrotica* the bone becomes disorganized, crumbles, and comes away in particles. Caries more generally signifies syphilis or tuberculosis (*strumous caries*.)

**Carillon.** See **Bell**.

**Carimata**, or **Karimata**, group of islands (over 100 in number) in the East Indian Archipelago, lying off the west coast of Borneo; p. 500.

**Carinates**, a division of birds which includes all living forms except the few running birds or *Ratitæ*—ostrich, emu, cassowary, etc. See **BIRDS**.

**Carinthia**, province of Austria lying be-

tween Tyrol on the w. and Styria on the e. Only 9 per cent. of the surface is unproductive, half the remainder being covered with forests, and the rest affording meadow and grazing land. Iron, lead, zinc, and lignite are mined. Two-thirds of the people are of German race, most of the remainder being Slovenes; p. 370,748.

**Carinus, Marcus Aurelius**, emperor of Rome (283-285 A.D.). Soon after his accession the troops in Asia put forward Diocletian as a rival. Carinus won a decisive victory over the new claimant near Margus, in Mœsia, but immediately afterward was murdered by some of his officers.

**Carisbrooke**, village, Isle of Wight, England. In its ruined castle Charles I. was imprisoned (1647-8), and here his daughter Elizabeth died in 1650.

**Carissa**, a genus of white-flowered tropical shrubs belonging to the natural order Apocynaceæ, and bearing berry-like fruits.

**Carissimi, Giacomo** (1604-74), Italian musical composer, was born in Marino, near Rome; was conductor of the choir at Assisi, and later at St. Apollinaris in Rome. Carissimi's most important work was done in the direction of developing and perfecting the sacred cantata and recitative, and in improving instrumental accompaniments.

**Caritat.** See **Condorcet**.

**Carit Etlar**, the pen-name of the Danish novelist and dramatist, JOHAN KARL CHRISTIAN BROSBOLL (1816-1900), who was born at Fredericia; was one of the most popular writers of Denmark in the 19th century, excelling especially in historical romances.

**Carlaverock**, parish, Scotland, in Dumfriesshire. In the parish churchyard is the grave of Richard Paterson, the original of Scott's *Old Mortality*; p. 799.

**Carlen, Emilia** (1807-92), Swedish novelist, better known as FLYGARE-CARLÉN, was born at Strömstad. See her *Reminiscences of Swedish Literary Life*.

**Carleton, Henry Guy** (1856-1910), American dramatist, was born in Fort Union, N. M.; began his dramatic work in 1881. His plays include *Memnon*, blank verse (1881); *Victor Durand* (1885); *A Princess of Erie* (1892); *A Gilded Fool* (1892); *Ambition* (1896); *Colinette* (1898); *Jack's Honeymoon* (1898).

**Carleton, Will** (1845-1912), American poet, was born in Hudson, Lenawee co., Mich. His published volumes include *Poems* (1871); *Farm Ballads* (1873); *Farm Legends*

(1875); *Farm Festivals* (1881); *City Ballads* (1885).

**Carleton, William** (1794-1869), Irish novelist, was born in Prillisk, county Tyrone; published *Trails and Stories of the Irish Peasantry*, and others.

**Carleton College**, a co-educational institution of higher learning situated in Northfield, Minn.; founded in 1866, and named in honor of William Carleton of Charlestown, Massachusetts, an early donor; is non-sectarian in control, but maintains relations of co-operation with the Congregational, Baptist, and Episcopal denominations. Four-year courses in the liberal arts are offered.

**Carli, Giovanni Rinaldo, Count** (1720-95), Italian antiquary, was born in Capo d'Istria; is said to have originated index numbers.

**Carlingford**, seaport town, Ireland, in County Louth. There are ruins of King John's castle and of a monastery of the 14th century. The town claims to be the landing place of St. Patrick in 432; p. 600.

**Carling Sunday.** See **Care Sunday**.

**Carlisle, city, England**, in Cumberland-shire, on the River Eden. Features of interest are the cathedral, founded as a priory church in 1092, and converted into a cathedral in 1133, and the castle, situated on a promontory overlooking the Eden, with massive Norman keep with double gates and portcullis. The citadel, at the s.e. entrance to the city, consists of two large drum towers, rebuilt in 1810; it is now used for the court of assize and jail. Carlisle was a Roman station near the Roman wall. The place was destroyed by the Danes (875). William Rufus built the castle and commenced the fortifications (1092), but the latter were not completed till the time of David, king of Scotland (1084-1153). During the civil war it was occupied alternately by the Royalists and the Parliamentarians. It also shared in the troubles of 1745, when several persons were hanged on Gallows' Hill; p. 52,600.

**Carlisle, borough, Pennsylvania**, county seat of Cumberland co.; the seat of the U. S. Indian Training and Industrial School, of Dickinson College and of the Metzger Institute for Girls; p. 16,812.

**Carlisle, George William Frederick Howard**, Seventh Earl of (1802-64), English politician and Lord Lieutenant of Ireland.

**Carlists**, the supporters of the Legitimist pretender to the throne of Spain.

**Carlos I.** (1863-1908), king of Portugal, son of Luiz I., was born in Lisbon, and ascended the throne in 1889. During his reign Portugal rose in international importance through the activity of colonization in Africa. But the country was in financial difficulties, and despite the fact that the king and his family surrendered a fifth of their income to meet public needs, the financial situation caused the growth of a strong radical sentiment among the people. In 1908 the King and Crown Prince Luiz were assassinated while driving in the capital. See PORTUGAL.

**Carlos, Don** (1545-68), the son of Philip II. of Spain, was of vicious character and feeble intellect, and was deprived by his father of the right of succession in favor of the Archduke Rudolf. In 1567 he was accused, on a statement made under confession, of plotting his father's murder, though it is more probable that the intended victim, who had not been named, was the Duke of Alva. The death of Don Carlos in the following year was attributed by William of Orange to his father's orders.

**Carlotta (Marie Charlotte Amélie)** (1840-1927), empress of Mexico, wife of Archduke Maximilian of Austria, and the only daughter of Leopold I. of Belgium. She was married to Maximilian in 1857, and accompanied her husband to Mexico, whither they went on invitation from the Assembly of Notables, at the suggestion of Napoleon III. In 1866 she returned to Europe to secure aid for her husband from Napoleon III. of France. Failing in this, she appealed without result to the Pope. Her health was much affected; after the failure of the Mexican enterprise, and the execution of Maximilian, her mind gave way. See MAXIMILIAN.

**Carlovingians, Carolingians, or Carolings**, the second reigning dynasty of France. The family dates from ARNULPH, bishop of Metz, in the 7th century. Arnulph's grandson, PEPIN, or PIPPIN, Duke of Austrasia, became mayor of the palace under the Merovingian kings. On Pepin's death (714), CHARLES MARTEL, natural son of Pepin, usurped the position. Charles's son, PEPIN (LE BREVE), in league with Pope Zachary, deposed Childeric, last of the Merovingians, and was crowned in 752. He was succeeded in 768 by his son, CHARLEMAGNE, who widely extended the empire. On the death of Charlemagne's son, LOUIS (814-840), the empire was divided among his three sons—viz., LOUIS (Germany), LOTHAIRE (Italy, Lorraine, and Burgundy), and CHARLES II.,

THE BALD (France). Charles II. died in 877, and was followed by a succession of feeble princes, the Carlovingian dynasty ending with Louis V. in 987, when the Capets began their reign.

**Carlow**, chief town of Carlow co., province of Leinster, Ireland. St. Patrick's College was founded in 1795. Slight vestiges remain of the ancient castle, which dates from 1180; p. 7, 175.

**Carlsbad, Carlsruhe, Carlstad**, etc. See also **Karlsbad, Karlsruhe, Karlstad**, etc.

**Carlsbad Cavern** lies in the foothills of the Guadalupe Mts., about 25 m. S.W. of Carlsbad, N. M. It is said to have been discovered in 1901 by James White and Abijah Long, whose attention was drawn by the large number of bats issuing from a hole in the side of the valley. The Cavern remained little known until 1923, when Robert A. Holley of the Land Office surveyed three m. of its corridors. On Oct. 25 the Cavern was proclaimed a Government reservation by President Coolidge. Further explorations were made by the National Geographic Society and an expedition of *The New York Times*. The dome of the largest room is 15,000 ft. around, and the room itself almost a m. long. From the ceilings depend huge clusters of stalactites of all sizes and colors. Marvellous formations resembling drapery and lace were observed, and many of the concretions suggested various fauna and flora. By the action of mineral water through untold ages the cavern was formed in a bed of limestone about 1,300 ft. thick. On May 15, 1930, President Hoover signed a bill creating this natural wonder a national park.

**Carlsbad Decrees**, resolutions passed at a series of conferences of German and Austrian statesmen and public officials, held at Carlsbad (at that time in Austria), during August 1819. The assembly was convened and presided over by Metternich, and the object was to suppress the rising tide of liberalism in Europe.

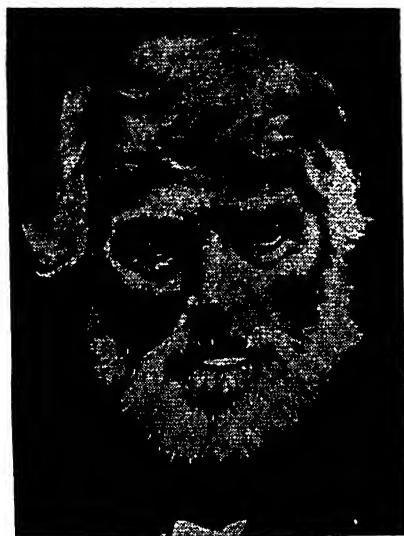
**Carlstadt, Andreas Rudolf Bodenstein of** (1483-1541), German theologian. He was a reformer of the most extreme stamp, outstripping Luther, with whom he held controversy.

**Carlyle, Jane Baillie Welsh** (1801-66), wife of Thomas Carlyle. Much has been made of the unhappiness of her married life, and it is evident that her husband might have made it easier if he had recognized her intellectual powers by consulting her more in regard to his work. From about 1842

Mrs. Carlyle was really a perpetual invalid, being tortured with unceasing attacks of neuralgia. She wrote some poetry of more than ordinary merit, and her posthumously-published letters mark her out as among the first letter-writers in the language. See *Letters and Memorials of Jane Welsh Carlyle*, ed. by J. A. Froude (1883); *Early Letters of Jane Welsh Carlyle*, ed. by D. G. Ritchie (1889); *Life of Jane Welsh Carlyle*, by Mrs. Alexander Ireland (1891).

**Carlyle, John Aitken** (1801-79), younger brother of Thomas Carlyle; executed an admirable translation of Dante's *Divine Comedy*, published in 1849. In 1861 he edited Irving's *Hist. of Scottish Poetry*.

**Carlyle, Thomas** (1795-1881), Scottish historian and moral teacher, was born, (December 4) at Ecclefechan, Dumfrireshire. His father, James Carlyle, a stonemason, was twice married, and Thomas



Thomas Carlyle.

was the first-born of his second wife, Janet Aitken. From Annan Academy he proceeded to Edinburgh University, where he matriculated in 1809. Carlyle had been intended for the ministry of the Church of Scotland, but after much hesitation he finally abandoned the purpose in the year 1817. He subsisted for a time by private teaching, translating scientific articles, and by doing biographical and geographical work for Brew-

ster's *Edinburgh Encyclopædia*. Life was made miserable for him by his lifelong foe dyspepsia, and also by doubt in religious matters. In 1824 he published a translation of Goethe's *Wühelm Meister*: and this, with his *Life of Schiller*, which first appeared (1823-4) in the *London Magazine*, and was published in book form in 1825, led to his long correspondence with Goethe. In 1826 he married Jane Baillie Welsh (see **CARLYLE, JANE BAILLIE WELSH**), and settled down in Edinburgh. Next year he published four volumes of translations entitled *German Romance*; and he began to write for the *Edinburgh Review*, for which he wrote that great series of essays beginning with the one on Richter—essays marked more by psychological than by critical insight. He now formed a new plan of removing to his wife's property at Craigenputtock, which his brother Alexander was to farm; and this plan was carried out in 1829, much to Mrs. Carlyle's discomfort. In the solitude of Craigenputtock Carlyle first found himself. Here his most characteristic work, *Sartor Resartus*, was written, and the *French Revolution* planned. And here, in 1833, he received a visit from Ralph Waldo Emerson. But in 1830, his brother's farming of Craigenputtock having proved a failure, the little household was in sore financial straits. *Sartor* was now at length (1833-34) appearing in *Fraser's*, and in June, 1834, the Carlyle household moved to London. By May, 1836, the first volume of the *French Revolution* was complete in ms.; but having been lent to John Stuart Mill it was burnt by his housemaid. However, the volume was recreated by September; and the complete work appeared in 1837, being received with enthusiasm. *Sartor Resartus* appeared in book form in the U. S. (1836), under the protection of Emerson, and now reappeared in England (1838). New works also were produced in fairly rapid succession. His last great work, the *History of Frederick the Great*, was begun in 1852, and occupied him for thirteen years. One of the most regrettable incidents of his life was the writing in 1863 of the paper, entitled *The American Iliad in a Nutshell*, a violent attack on the anti-slavery side in the American civil war; and the bequest to Harvard University after his death of the books used in the composition of *Frederick and Cromwell* was undoubtedly designed as a reparation for the wrong done on this occasion. On the 21st of April, 1866, his wife died; and his whole after-life was

saddened by the discovery, from her letters and journals, how unhappy her life had been. He visited Mentone in 1867, and began the writing of his *Reminiscences* (published by his literary executor, Froude, in 1881).

Carlyle was in perpetual opposition to the main tendencies of his own age. He preached the benefits of benevolent despotism to a generation whose main political work was the development of democratic principles; and to an age of easy optimism; he proclaimed the doctrine that wealth is not prosperity, and only brings new dangers instead of removing the old. This perpetual opposition, which made him such a healthy stimulus to his first readers, however, is apt to militate against him with their successors. The defects of his method—his habitual exaggeration, his exaltation of the individual at the expense of the people, and the great preponderance of destructive criticism in his works—rather repel readers of today. But his doctrine of the sacredness of work and the sacredness of truth, have already passed into the current thought of our time. As a literary artist, as a painter of individuals and individual scenes in biography and history, he is unrivalled among the prose writers of the world.

See J. A. Froude's *Thomas Carlyle: a History of the First Forty Years of His Life* (1882), and his *Thomas Carlyle: a History of his Life in London* (1884); also *Carlyle's Reminiscences*, edited by Froude's (1881) and by Professor Norton (1887).

**Carmagnola**, **Francesco di Bartolomeo Bussone** (c. 1390-1432), Italian condottiere, was the son of a peasant of Carmagnola (Piedmont), whence his surname. He entered in 1412 the service of Visconti, Duke of Milan. Losing the confidence of his prince through court intrigues, he transferred his services (1425) to Venice, which entrusted him with the command of the expedition against the Duke of Milan. Having won a victory at Maclodio in 1427, he conquered (1428) Bergamo and a part of Cremona, and forced Visconti to make an unfavorable peace. Being suspected of treachery by the Venetian senate, he was enticed into the Doge's palace, separated from his suite, tortured, and executed in the Piazza, in 1432.

**Carmagnole**. (1.) A vest adorned with several rows of buttons, popular in the s. of France, during the troublous times. (2.) A revolutionary song, and dance; the rage in Paris in 1792 and following years.

**Carman** (**William**) **Bliss** (1861-1929), Canadian poet, born at Fredericton, New Brunswick; published *By the Aurelian Wall* (1898), *Pipes of Pan* (5 vols., 1902-5), *Collected Poems* (1905); and two volumes of essays—*The Kinship of Nature* (1903) and *The Friendship of Art* (1904).

**Cardmarthenshire**, a maritime co. of S. Wales, on the Bristol Channel. Near Llan-dilo was fought, about 1277, one of the last battles in which Edward I. destroyed the independence of Wales. In 1843 the inhabitants took a very active share in the Rebecca riots. The county is very rich in antiquarian remains; p. 175,069.

**Carmaux**, tn., dep. Tarn, France; is the centre of a coal-mining district; p. 11,607.

**Carmel**. (1.) a town of Palestine, in Judah. (2.) Mt. Carmel, a long hill (1,700 ft.) in N.W. Palestine, terminating in a bold headland (500 ft.) on the Mediterranean. (3.) Tn., N. Y., co. seat of Putnam co., the scat of Drew Seminary; p. of the town 1,526.

**Carmelites**, or **Order of Our Lady of Mt. Carmel**, popularly known in former times as 'White Friars.' Although this order was practically founded in 1156 by an Italian monk and ex-crusader, Berthold, on Mt. Carmel, it was nevertheless believed by many that a succession of holy men had lived the anchoritic life there from the time of Elijah; and these conflicting beliefs culminated in the 17th century in a bitter controversy, eventually silenced by a Papal edict of 1698. After 1238 the Mohammedans caused the Carmelites to leave Mount Carmel, and they settled in various European countries. Today, there are Carmelite houses in America, England, Ireland, and Spain.

**Carmina Burana**, songs, mostly Latin, some also German, written in the 12th and 13th centuries by wandering students (Goliards). They are similar in form to the church hymns, and their subjects, though mostly of a religious character, sometimes turn also on profane and even immoral matters.

**Carminatives**, a class of remedies used in medicine for the relief of gastric and intestinal discomfort, caused by the collection of gases formed during imperfect digestion. Peppermint, spearmint, and sodium carbonate are the most familiar examples.

**Carmine**, a beautiful red coloring substance obtained from the cochineal insect.

**Carmona**, town, province of Seville, Spain. It has many Roman and Moorish remains including a Roman necropolis of great inter-

est, and considerable portions of the Moorish wall and alcazar; p. 24,876.

**Carnac**, a Breton village, department of Morbihan, France, on the Quiberon peninsula.

**Carnallite** ( $\text{KCaMgCl}_2 \cdot 6\text{H}_2\text{O}$ ) is a double chloride of potassium and magnesium, forming a valuable source of these metals, and found in considerable quantities at Stassfurt in Prussia. See POTASSIUM.

**Carnarvon**, or **Caernarvon**, seaport town, capital of Carnarvonshire, Wales, is situated near the southern end of Menai Strait. There are remains of the ancient walls, and the castle, commenced by Edward I. in 1283, is one of the noblest ruins in Great Britain. Carnarvon was an old Roman station, and a residence of early Welsh princes; p. 8,301.

**Carnarvon**, district and town, Cape of Good Hope. It is famed for the vast reservoir known as Van Wyk's Vlee; p. of district, 7,000.

**Carnarvon, Henry Howard Molyneux Herbert**, Fourth Earl of (1831-90), English public official; served as Colonial Secretary in Disraeli's government from 1874-1878.

**Carnarvon, 5th Earl of** (1877-1923), British archeologist who in 1923 discovered in Thebes the ancient tomb of King Tut-Ankh-Amen, Egyptian pharaoh. He died in the same year of pneumonia which developed after he had been bitten by an insect at the tomb. The superstitious attributed his death to the vengeance of the pharaoh, over whose tomb was inscribed a warning of death to any who dared violate its sanctity.

**Carnarvonshire**, the most northwesterly county in the mainland of Wales, is separated from Anglesey by the Menai Strait. Area 563 sq. m.; p. 130,975.

**Carnassial** or **Sectorial Teeth** are teeth specially adapted for tearing flesh, and are peculiar to the terrestrial carnivora. In the typical carnivores there is one carnassial tooth at each side in each jaw. In the upper jaw it is the last premolar which forms the carnassial; in the lower, the first molar.

**Carnation**, a double flowering variety of the clove pink, is a half hardy herbaceous, perennial plant, a native of Southern Europe, having been cultivated by the ancient Greeks and Romans.

**Carnauba**, a Brazilian palm, the under surface of the leaves of which yields a wax used to adulterate beeswax, in the manufacture of candles, etc. The timber is used for veneering, the fruit is edible, and the leaf is woven into mats, hats, baskets, etc.

**Carneades** (c. 213-129 B.C.), of Cyrene, in Africa, Greek philosopher.

**Carnedd Dafydd** and **Carnedd Llewelyn**. See **Snowdon**.

**Carnegie, Andrew** (1835-1919), American manufacturer and philanthropist, born in Dunfermline, Scotland, Nov. 25, 1835. In 1848 his parents came to America, and settled in Allegheny City. Andrew was employed first as a 'bobbin boy', and then entered the service of the Ohio Telegraph Company as a messenger boy, learned telegraphy, and became an operator on the Pennsylvania Railroad. He was promoted to the office of secretary to the superintendent, and in 1860 became superintendent of the Pittsburg division of the railroad, a position he held until shortly after the Civil War. When war seemed imminent, he was called to Washington and organized the Military Telegraph Corps. In 1854 he made his first investment—ten shares of Adams Express Company Stock—with money borrowed from his uncle. He also saw the advantages of the sleeping car, then newly invented; invested money in the Woodruff Sleeping Car Company, and obtained the adoption of the system on the Pennsylvania. On the discovery of oil in Pennsylvania, in 1861, he invested his dividends and savings in oil lands, which yielded a large profit. He also became interested in the Iron City Forge Company and the Keystone Bridge Company. In 1868 he visited England and investigated the Bessemer steel processes, and on his return broke new ground by founding the Union Mills, Pittsburgh, for the manufacture of steel rails.

In 1875 all the concerns in which Carnegie was interested were amalgamated under the title of 'Carnegie Brothers & Co.' In 1883 the Homestead Steel Works were acquired. In 1892 the Frick Coke Company was amalgamated with it, and in 1901 the entire Carnegie enterprise was taken over by the United States Steel Corporation. Mr. Carnegie retiring from active business with an interest in the company amounting to \$250,000,000.

Mr. Carnegie died suddenly after a short illness with pneumonia, at his summer home at Lenox, Mass., on August 11, 1919. The philanthropic works of Andrew Carnegie are famed throughout the world, his numerous benefactions being estimated at over \$350,695,000. He expended on 2,811 libraries, located in all parts of the world, the sum of \$60,364,808. To the Scottish universities, for the payment of class fees for the students, he in 1901 gave \$10,000,000. He gave also \$1,-

500,000 for the erection of the Peace Palace at the Hague. In April, 1907, he presided at the Peace Conference held in New York, and the same year gave \$750,000 to house the Bureau of American Republics in Washington. In 1912 he gave \$125,000,000 to the Carnegie Corporation of New York, which was organized to carry on work in which he was interested. At his death his estate was valued



*Carnations.*

at between \$25,000,000 and \$30,000,000, of which \$20,000,000 was left to the Carnegie Corporation. Mr. Carnegie's writings include *The Gospel of Wealth* (1900); *The Empire of Business* (1902); *Life of James Watt* (1905); *Problems of Today* (1908).

**Carnegie Endowment for International Peace**, a foundation of \$10,000,000 given by Andrew Carnegie in 1910 for the promotion of international peace. Its object, as outlined by the trustees (28 in number) at their first meeting, in March, 1911, is to advance the cause of peace among nations, to hasten the abolition of international war, and to encourage and promote a peaceful settlement of international differences. These objects are to be attained by promoting investigations as to the cause of war and practical methods of avoiding and preventing it; by diffusing

information; by educating public opinion; by establishing a better understanding of international rights and duties; by cultivating friendly knowledge and understanding between different countries, and by maintaining, promoting, and assisting all associations and agencies that shall be deemed necessary and useful in attaining the purposes of the corporation.

**Carnegie Foundation for the Advancement of Teaching**, a fund of \$15,000,000 created in 1905 by Andrew Carnegie, the income of which is used for retiring allowances to officers and teachers in institutions of higher learning in English-speaking North America, and for pensions for the widows of such officers and teachers. In 1908, \$5,000,000 was added to the original gift of \$10,000,000, so that tax-supported colleges, universities, and technical schools, not included in the fund up to that time, might be admitted to its benefits. In 1911, Mr. Carnegie endowed the Educational Enquiry of the Foundation with \$1,250,000. In order that the Foundation shall be an integral part of higher education in America, the trustees have dealt, so far as possible, with institutions rather than with individuals. For this reason, they created what is called the accepted list of institutions. To be placed on this, an institution must conform to definite regulations with regard to educational standards, form of government, and amount of endowment. Once an institution is placed on this list, its teachers and officers receive retiring allowances as a matter of right and under fixed rules as to age and length of service.

**Carnegie Hero Funds**. In 1904 a fund of \$5,000,000 was created by Andrew Carnegie, for the purpose of rewarding heroic efforts, to save human life in the United States, Newfoundland, and Canada, to relieve those injured in making such efforts, and to provide for those dependent upon them where life was sacrificed. Heroic acts are brought to the attention of this Commission either through direct application or through the public press. In each acceptable case a medal of gold, silver, or bronze is awarded; and in appropriate cases an additional award of money is granted.

**Carnegie Institute**, an institution for technical education given by Andrew Carnegie to the city of Pittsburgh in 1900. His original gift was \$1,000,000, which was later increased until it reached a total of \$4,000,000 for equipment and building, and \$7,000,000 for endowment. There are four separate

schools, each with its own faculty and student body, i.e., The School of Applied Science, School of Applied Design, School of Applied Industries, and Margaret Morrison School for Women.

**Carnegie Institution of Washington**, an organization founded by Andrew Carnegie on Jan. 28, 1902, with a gift of \$10,000,000, which he increased by \$2,000,000 on Dec. 10, 1907, and by \$10,000,000 on Jan. 19, 1911. The Institution was incorporated by act of Congress, approved April 28, 1904, the articles of incorporation declaring in general 'that the objects of the corporation shall be to encourage in the broadest and most liberal manner investigation, research, and discovery, and the application of knowledge to the improvement of mankind.' The work may be conveniently classed under three heads: (1) Large projects whose execution requires continuous research by a corps of investigators during a series of years. Ten such departments have been established, as follows: Botanical Research, Experimental Evolution, Economics and Sociology, Geophysical Laboratory, Marine Biology, Meridian Astronomy, Historical Research, Mt. Wilson Solar Observatory, Nutrition Laboratory, and Terrestrial Magnetism. (2) Minor projects which may be carried out by individual experts in a limited period of time, or by investigators possessing exceptional abilities and opportunities for research work. (3) The publication of the results of investigation made under the auspices of the Institution.

**Carnelian**, or **Cornelian**, in mineralogy, a variety of chalcedony, of a bright red color, which takes on a fine polish and is used as a ring stone, and for brooches, seals, and ornaments. An oxide of iron is the coloring matter.

**Carnic Alps**. See **Southeastern Alps**.

**Carniola**, former crown land of Austria; under the terms of the Austrian Peace Treaty (1919) included in the new Jugo-Slav state (see **JUGO-SLAVS**). It is bounded by Trieste on the w., Croatia and Slavonia on the s. and e.e., and Carinthia and Styria on the n. and n.w. Area 3,856 sq. m. The people are mostly Slavonic. The capital is Laibach; p. 525,000.

**Carnival**, a period of rejoicing and festivity, observed in many parts of Europe and America—usually between Epiphany and Shrove Tuesday. At the present day, the carnival is observed in Italy, and parts of Germany, France, and the United States. In Rome the advent of carnival is announced on Twelfth Night by youths attired as monks

and wearing masks, who perambulate the streets, shouting their news to the passersby. The carnival in New Orleans is the most famous of these revels in the United States.

**Carnivora**, an order of mammals. The large majority feed upon flesh of some kind, typically upon recently killed warm-blooded animals; but the bears, for example, are largely vegetable eaters. They are characterized by the fact that never less than four toes are present on each foot, by the nature of the teeth, and by certain internal peculiarities.

**Carnivorous Plants**. See **Insectivorous Plants**.

**Carnot, Lazare Nicolas Marguerite** (1753-1823), French republican statesman, general, and mathematician, was born in Noyon in Burgundy. He was appointed minister of war in 1793, and again when he supported Bonaparte, and arranged with him the plan of the Italian campaign. Proscribed by Barras (1797), he escaped to Germany, and later joined the Tribunat, and opposed Bonaparte's assumption of imperial power. He was Minister of the Interior during the 'Hundred Days'. Following the restoration of Louis XVIII., he retired to Germany, where he died. He published a number of valuable mathematical works.

**Carnot, Lazare Hippolyte** (1801-88), French public official, son of Lazare N. M. Carnot. His publications include *Mémoires sur Carnot* (1861-4); *La révolution française* (1869-72); *Lazare Hoche* (1874).

**Carnot, Marie François Sadi** (1837-94), president of the French republic, eldest son of Lazare Hippolyte Carnot; served successively as Minister of Public Works, Minister of Finance, and finally, as President of France.

**Carnot, Nicholas Léonard Sadi** (1796-1832), French physicist, son of Lazare Nicolas Marguerite Carnot; is best known as the founder of the science of thermo-dynamics. His great work, *Réflexions sur la puissance motrice du feu*, published in 1824, describes his cycle and reversible engine.

**Carnuntum**, or **Carnutum**, ancient town of Pannonia, on the Danube. It was the headquarters of the Romans in their military operations against the Germans, and for three years the residence of Marcus Aurelius during his campaign against the Marcomanni.

**Carnutes**, a tribe of Gauls who lived in the center of ancient Gaul, between the Liger (Loire) and the Sequana (Seine); their capital was Genabum (Orleans).



**Caro, Annibale** (1507-66), Italian poet, was born in Civitanova (March of Ancona). His most valuable work is his translation of the *Aeneid* (1581); he also made a beautiful translation of Longus' *Amore Pastoralis*.

**Caro, Elme Marie** (1826-87), French philosopher, was born in Poitiers. Such was his popularity at the Sorbonne that, as 'philosophe des dames,' he was satirized in the comedy *Le monde ou l'on s'ennuie*.

**Carob, or Locust Tree**, a handsome evergreen tree native to the Mediterranean region. It reaches a height of from 40 to 50 ft., and bears shining pinnate leaves, racemes of red flowers, and brown leathery pods containing a sweet gummy substance and small brown beans.

**Carol**, originally a term for a dance, or for songs intermingled with dancing, later used to signify festive songs, particularly such as were sung at Christmas. The first printed collection of English carols came from the press of Wynkyn de Worde in 1521.

**Carol II** (1893-1953), King of Rumania. During World War I, while Crown Prince he married Jeanne Lambrino in an elopement, but the marriage was not recognized because the bride was a commoner. It was annulled in 1921 when he married Princess Helen of Greece who divorced him after he had fled the country with Mme. Magda Lupescu. At the death of King Ferdinand, Carol's son Prince Michael ascended the throne, with the Dowager Queen Marie ruling as regent. Carol reclaimed the throne in 1930 and reigned until 1940 when German machinations forced him to abdicate. With Mme. Lupescu he fled to Spain, and in 1941 they entered Portugal and thence removed to Cuba.

**Carolina Allspice**. See *Calycanthus*.

**Carolina Tea**. See *Yapon*.

**Caroline Affair**, a diplomatic difficulty between the United States and Great Britain arising in 1837. During the Canadian rebellion, certain insurrectionists seized Navy Island (British) in the Niagara River, to which men and supplies were subsequently conveyed in the American steamboat *Caroline*. A Canadian party was sent to capture this vessel, and though they found her moored on the American shore, nevertheless seized and burned her, an American being killed. The United States Government demanded reparation for this violation of neutrality, and the situation reached a crisis when in 1840 one Alexander McLeod, who had boasted of participating in the affair, was arrested and tried

for murder in New York. Great Britain immediately avowed responsibility and demanded of the United States the release of McLeod. New York refused to surrender her jurisdiction to the National Government, but McLeod, defended, at Secretary of State Webster's instance, by the Federal district-attorney, was eventually acquitted, proving an *alibi*, and the threatened rupture between the two nations was averted.

**Caroline Islands**, an archipelago of about 600 islets and islands in Pacific O., divided for adm. purposes into 2 groups, E. and W. Total area about 380 sq. mi. Disc. by Portuguese Diego da Rocha 1527; given present name 1688, in honor of Charles II of Spain; became a German poss. 1899. Soon after W.W. I occupied and adm. by Japan under a mandate. Fortified in violation of mandate. From here Pearl Harbor attack was launched 1941. Captured by U. S. forces during W.W. II. Included in the 625 W. Pac. I. forming a U.N. Trust Territory 1947. U. S. awarded adm. with authority to fortify if essential to their security.

**Caroline, Matilda** (1751-75), daughter of Frederick, Prince of Wales, was married in 1766 to Christian VII. of Denmark, to whom she bore the future Frederick VI. in 1768.

**Carolings**. See *Carlovingians*.

**Carolus**, a gold coin first struck in the reign of Charles I., originally equal to £1, but later valued at 23 shillings.

**Carolus-Duran, Emile Auguste** (1837-1917), French artist, originally known as CHARLES EMILE AUGUSTE DURAND, was born in Lille. His works include *The Glory of Marie de Medici* for the Luxembourg ceiling; *Lady with the Glove*, probably his masterpiece; *The Triumph of Bacchus*, and many others. He was a grand officer of the Legion of Honor, a member of the Academy of Beaux-Arts, and from 1904 to 1913 director of the French Academy in Rome.

**Carotid Artery**, the great artery which divides into two branches, one on either side of the neck, and supplies blood to the head and neck. See *CIRCULATION*.

**Carotin**, the coloring matter found in the carrot and in the tomato. It is present, also, in maize, squash, orange peel, mustard seed, and other vegetable matters and occurs as the coloring matter of milk-fat.

**Carp**, a fresh-water fish, native of the East, especially China, but abundant as an introduced form throughout Europe and North America.

**Carp, Petrache** (1837-1919), Rumanian

statesman, born at Jassy; founded the Junimist or Young Rumanian party (1876); became premier in 1900.

**Carpaccio, Vittore** (1450-1522), Venetian painter, best known for *The Presentation in the Temple* (1510), Venetian Academy.

**Carpathians**, one of the principal mountain ranges of Europe, sweeping in an irregular semi-circle round the n.w., n., n.e., e., and s.e. of Hungary, which it barricades against Moravia, Galicia, and Roumania. Length from the Danube, in the w., to the Iron Gates, in the e., nearly 1,000 m., with a breadth varying from 10 to 200 m. The system consists of the following series of ranges, following one after another: Little Carpathians (2,400 to 3,200 ft.), White Mts., W. Beskids (Phlsko, 5,110 ft.; and Babia Gora, 5,660 ft.), E. Beskids, Carpathian Forest Mts. (Guimaleu, 6,100 ft.; Czerna Gora, 6,750 ft.), Transylvanian Highlands, and Alps.

**Carpeaux, Jean Baptiste** (1827-75), French sculptor. Among his works are *La Palombella* (1858), a bust of an Italian girl; the bronze group of *Ugolino and his Children* (1863), in the Tuileries Gardens at Paris; the bust of the *Princess Mathilde* (1863); the bust of *Alexandre Dumas fils* (1874).

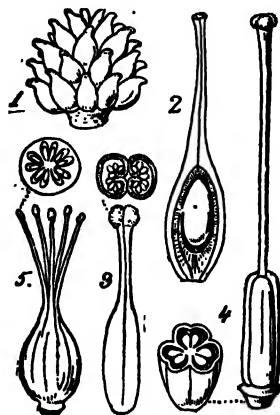
**Carpel**. The central part of a flower is the pistil or gynæcium and its several parts of floral leaves the carpels. Each carpel consists of a swollen hollow part called the ovary, enveloping the ovule or ovules, which when fertilized become seeds; of an expanded superior surface called the stigma, to which adhere the pollen grains destined to fertilize the ovules below; and generally, also, of a stalk or column between the ovary and the stigma.

**Carpenter, George L.** (1872- ), Salvation Army general; b. Australia; head of Canadian division of S. A. for many years; elected international commander-in-chief, succeeding Evangeline Booth, Aug. 1939.

**Carpenter, Mary** (1807-77), English philanthropist, was born at Exeter. Dr. Tuckerman, the Boston philanthropist, stimulated her to work for destitute children. The passing of the Youthful Offenders Bill (1854) was largely due to her exertions. She visited the U. S. in 1873, and lectured there and in Canada on prison reform. Author of *Reformatory Schools* (1851), *Juvenile Delinquency* (1853), *Six Months in India* (1868), and *Reformatory Prison Discipline* (1872).

**Carpenter, Rollo Clinton** (1852-1919), American engineer and educator, born at Orion, Mich., was educated at Mich. Agricul-

tural College, at the University of Michigan, where he graduated c.e. in 1875, and at Cornell University; and was a professor in the Michigan Agriculture College from 1878 to 1890, when he became professor of experimental engineering in Cornell University. He gained a wide reputation as a consulting engineer.



Types of Carpel.

- 1, Apocarpous (buttercup); 2, Monocarpellary (peach); 3, bicarpellary and section (erythraea); 4, tricarpellary and section (lily); 5, polycarpellary and section (linum).

**Carpenter, William Benjamin** (1813-85), English naturalist and physiologist, brother of Mary Carpenter; the author of *Principles of General and Comparative Physiology* (4th ed., 1854), *Principles of Mental Physiology* (7th ed., 1896), and *The Microscope and its Revelations* (8th ed., by Dallinger, 1901).

**Carpenter Bee**, a bee so named on account of its habit of forming a nest in dry wood, in which it excavates parallel galleries. See BEES.

**Carpentras**, tn., dep. Vaucluse, on the riv. Auzon. It is a walled town with four gates, the Porte d'Orange being one. The cathedral is Gothic, and there is also a Roman triumphal arch; p. 10443.

**Carpentry** is the art of working timber with cutting and other tools. A knowledge of the laws of mechanics is required in order to design successfully roofs, floors, bridges, the centering for arches, and those other structures in which a correct proportion and dis-

position of the component parts is essential. The first requisite is a knowledge of the different methods of joining pieces of timber so as to bear the strains which come upon them under varying conditions. The mortise-and-tenon joint is used in all varieties of framing, where one piece of timber meets another without crossing it. The tenon, or projecting portion left on the end of the first timber, fits tightly into the mortise, or hole, cut in the second, and is secured to it by glue or by wedges driven into it on the farther side. Modifications of this are adapted for cases where the entering timber is at an acute angle with the receiving piece, and presses against it in the direction of its length. The joints of rafters and tie-beams afford example of these and similar joints, in which great care is necessary to provide a bearing surface at right angles to the direction of the thrust. In rougher work, instead of the mortise-and-tenon joint, the plan is often adopted of 'halving' the portions of timber in contact so that when joined they present a flush face, afterward uniting them firmly by one or more bolts. Notching, cogging, and housing are somewhat similar operations, performed to join timbers which cross each other—no strength of union, however, being obtained without the use of bolts and straps. Scarf joints are employed in joining longitudinal timbers so as to form a beam of greater length than a single piece of wood would naturally afford. Hard-wood keys are driven through the holes in the joint, to make the parts of it fit closely to each other; and while these must be driven in sufficiently tight to close up the joint, care must be taken to avoid any strain being put on the fibres of the wood by forcing the parts together too much. The simplest form of roof, employed only for spans under 20 ft., consists of common rafters meeting at a ridge-pole, and held together by a light tie or 'collar-beam' at about the center of each. The lower ends of the rafters rest on a wooden wall-plate, which they are notched to receive. For larger spans trussed 'principals' are adopted. The simplest form of these is the king-post roof, in which a tie-beam holds together the feet of the principal rafters. The weight of the tie-beam is held by a vertical king-post attached to the rafters at their apex, and supporting on shoulders near its base two diagonal struts which stiffen the rafters. For spans over 30 ft. the king-post is usually replaced by two queen-posts, in order to avoid leaving the rafters unsupported for so much as half their

length. The roof principals are usually placed at a distance of about 10 ft. apart. They are connected by longitudinal timbers called 'purlins,' which in their turn support the 'common' rafters on which the roof itself is laid. In roofs of large span where the principals are necessarily heavy and costly, an economy may be effected by spacing them further apart and strengthening the purlins (which have to bear a cross strain) by means of trussing—a method not infrequently applied also to long beams in bridges and other temporary works. Trussing consists in supporting the beam by two or more iron struts near the center, their weight being carried by iron tension rods which have a bearing on the fixed ends of the beam.

Floors.—The timber framing which supports the flooring boards of the room above and the ceiling of the room beneath is constructed on one of three general designs. (1.) Single-joisted floors consist of only one series of joists, which rest on the wall-plate at either end. If an obstacle, such as a fireplace, intervenes, a bearing is afforded on a cross-piece or 'trimmer', which is mortised into the full-length joist on each side. (2.) Double floors have three tiers of joists—(a) the binding joists, which are the chief supports, and which rest on the walls (as before); (b) the bridging joists above and (c) the ceiling joists below, which cross the main series and are notched into them, holding respectively the floor boards and the ceiling. (3.) Framed floors have in addition main beams, into which the binding joists are framed at intervals, instead of crossing the whole width of the room.

Partitions are frames of timber used for dividing the upper stories of a house into rooms. They are usually faced on each side with lath and plaster; or the spaces between the timber may be filled in with concrete or brickwork.

**Carpet Baggers**, a name derisively applied to those Northern men who went South after the Civil War and took an active part in Reconstruction policies, as leaders of the negroes and often as office-holders in the Reconstruction governments of the various Southern states.

**Carpet Bug**, a small spotted beetle of the destructive family Dermestidæ, which, when adult, feeds upon the pollen of flowers.

**Carpet Moths**, a name given by British collectors to many of the Geometridæ, whose larvæ are called 'loopers,' and which have beautifully-patterned wings.

**Carpet Snake**, a large, harmless, highly variegated and extremely common Australian serpent.

**Carpets** came to us originally from the East, where the rug or carpet is the most important—often, indeed, almost the only—furnishing of the house: the Moslem always spreads his carpet for prayer. Turkey, Persia, and India still send us the most beautiful



*Preparation for Chenille Carpet.*

Cut into strips at dotted lines, A, to form B.

examples of the art, but it is with the modern industry, as carried on in large factories, that we will deal. France was the first to develop carpet-making, at the Louvre in 1607; but the revocation in 1685 of the Edict of Nantes



*Section of Brussels Carpet.*

Loops woven over wires A; B, wires removed.

drove many French craftsmen across the Channel, to settle at Bristol, Axminster, and other places in the southwest of England. The industry was started at Philadelphia, in 1791, and was greatly developed there and in other American cities; and since then the U. S. has played the most important part in the design-



*Velvet Pile and Wilton Carpet.*

Left, Loops on wires; Right, Loops cut to form pile.

ing of carpet looms, though no new structure of carpet has been invented. There are two distinct classes of carpet—ordinary woven fabrics and pile fabrics. Ordinary woven fabrics are variously known as Ingrain or Kidderminster carpets. The earliest known example of this double-cloth structure dates

from about the 16th century. Of pile fabrics there are three principal kinds: Chenille Piles, known as Chenille Axminsters; ordinary wired Piles known as Tapestry, Brussels, Wilton, or Velvet carpets, and Tuft-woven Piles, known as Victoria, Royal, etc., Axminsters. Chenille Axminsters—Chenille (Fr. 'caterpillar') denotes a thick, loose, fluffy thread. The figure on the Chenille Axminster is of a colored pile formed by a series of woven pile-thread, or, as they are technically called, 'chenille-picks.' Each pick is of one of the colors of the design, and the weaving operations consists in laying these picks in their right relative positions in the cloth. The Brussels is a wired-pile carpet. Its pile consists of loose loops of worsted thread formed over wires, and held down at their bases by a firm fabric of linen threads, into which the colored worsted loops are woven. When the wires, after forming the loops, cut through them at their highest point, the Wilton or Velvet carpet is produced; the pile in this case forms a kind of plush. The tapestry carpet is the simplest form of the wired-pile carpet, and resembles a Brussels carpet. The pattern is, however, not produced by the weaving together of threads of different colors, but is printed on the warp in an elongated form. Carpets of the tuft-woven pile or moquette type were first made at Nîmes, France, on hand looms. The power loom which produces the tufted pile was invented in the United States in 1856. The essential feature of these carpets is the introduction into a simple framework of warp and weft of a series of tufts sufficiently long to form a pile. Special varieties of carpets are woven from strips of brightly colored rags common in the United States from colonial times, and from grass and vegetable fibres. See RUGS. Consult F. Bradbury's *Carpet Manufacture*; M. J. O'Brien's *Rug and Carpet Book* (1946).

**Carpet Sweeper**, a dust-saving device for sweeping carpets and rugs, the principle of which is that of a brush revolving inside a dustpan, thus picking up the dust and confining it at the same time. The vacuum cleaner, by which dust is extracted by means of air suction, is now largely replacing the sweeper, especially in hotels and large establishments. See VACUUM CLEANERS.

**Carpi**, town and episcopal see, province Modena, Italy. It has two cathedrals and a fine Renaissance church of the 15th century, and carries on silk industries; p. 36, 172.

**Carpocrates**, an Alexandrian Gnostic of the 2nd century, who taught the pre-exist-

ence of souls, and founded the Gnostic sect of Carpocratians. According to him, those who can recall their pre-existing state may regain the harmony of complete union with God. See Gnostics.

**Carpolites**, or **Carpolith**, the fossil fruits of certain carboniferous trees variously shaped.

**Carpophore**, in botany, is a continuation of the flower stalk, which passes in certain flowers, notably those of the order Umbelliferae, between the carpels, until it reaches their highest points.

**Carpospore**, one of the spores in the life history of the red algæ (Rhodophyceae).

**Carpus**, **Carpal Bones**. See **Hand**; **Skeleton**.

**Carr, Robert**. See **Somerset, Earl of**.

**Carracci**, or **Saracci**, a celebrated family of Italian painters, the founders of the Bolognese or Eclectic school of painting. The best Italian masters of the 17th century proceeded from the school of the Carracci.

LUDOVICO CARRACCI (1555-1619) was born at Bologna. He studied under Tintoretto. In conjunction with two of his cousins, Agostino and Annibale, he founded (in 1589), in spite of great opposition, the Eclectic school which afterward became so famous in the history of painting. So great was their success that in the course of a short time all other schools of painting were closed in Bologna. Some of the finest works of this master are preserved at Bologna—among others, the *Madonna and Child Throned*, *Madonna and Child Standing*, *The Transfiguration*, and the *Nativity of St. John the Baptist*.

AGOSTINO CARRACCI (1558-1602), cousin of Ludovico, was born at Bologna. He became a disciple of his cousin, but he also achieved a name for himself as an engraver. He settled in Parma, and is remembered for his *Communion of St. Jerome*, and *Love: Celestial, Terrestrial, and Venal*.

ANNIBALE CARRACCI (1560-1609), brother of Agostino, was born at Bologna. He was one of the greatest followers of Correggio, and in composition approached most nearly to the style of Raphael. He was unquestionably the greatest artist of the three Carracci. His best works are his mythological frescoes in Rome.

**Carrageen**, **Carrageen Moss**, or **Irish Moss**, the Irish name of *Chondrus crispus*, and some other allied species of seaweeds, long of local importance as an article of food, but now widely diffused. The true carrageen occurs commonly on rocky shores, particu-

larly in Northern Europe. After being collected and washed in fresh water, it is bleached and dried in the open air; and is then white or yellowish, dry shrunken, horny, and translucent.

**Carranza**, **Venustiano** (1859-1920), Mexican general, constitutionalist leader, and president, born in Cuatro Ciénegas, in the state of Coahuila. In 1910 he joined the revolutionary forces of Madero. In February, 1913, after the arrest of President Madero and Suarez by Huerta, Carranza obtained from the legislature extraordinary powers to sustain the constitutionalist orders of the Republic by force of arms, and in March published the Plan of Guadalupe, in which he is named First Chief of the Constitutionalist Army. On Oct. 9, 1915, the Pan-American Conference, representing seven American republics, including the United States, recognized him as president of Mexico. See MEXICO, *History*.

**Carrara**, town, province Massa Carrara, Italy, is famous for its quarries of fine-grained marble, mostly white, but also black, yellow, and green. The Carraran marble was known to the Romans, who called it *marmor lunense* (from the port of Luna). Between the downfall of the empire and the end of the 15th century it was not worked; it is now, however, in great request; p. 62,796.

**Carrel**, **Alexis** (1873-1944), French-American surgeon and biologist, born in Lyons, France. In 1905 he came to the United States, where he first attracted attention by his articles on *Anastomosis and Transplantation of Blood Vessels* and *Amputation of the Thigh and Its Replantation*. In 1912 he was awarded the Nobel Prize for Medicine. He has made highly valuable discoveries in the surgery of the blood vessels, and has published many monographs of his surgical operations.

In 1936, in collaboration with Charles A. Lindbergh he designed an artificial heart. He published in the same year *Man the Unknown*, which has brought him wide attention. In it he proposed that an intellectual elite, 'the thinking centre,' be endowed with supreme political power for the common good. This follows from his claim that democratic equality is incompatible with hereditary, physical, and mental differences.

**Carrel**, **Nicolas Armand** (1800-36), French publicist, born at Rouen. After a short military career he became Thierry's secretary and collaborator. In 1830 he joined Thiers and Mignet in editing the *National*. A newspaper war with the editor of *La*

*Presse* led to a duel, in which Carrel was mortally wounded. His *Œuvres Politiques et Littéraires* were edited by Littré.

**Carreño, Teresa** (1853-1917), Venezuelan pianist, was born in Caracas, and at an early age achieved distinction. Before finally adopting the career of a piano virtuoso she sang in opera under Mapleson and Maurice Strakosch. She published numerous pieces for piano, and was the composer of the Venezuelan national anthem.

**Carrer, Luigi** (1801-50), Italian poet and scholar, was born at Venice. He published several volumes of poetry, his lyrical pieces showing the influence of Foscolo, (whose life he wrote). As an editor of various Italian classics—Petrarch, Boiardo, Della Casa, Bembo, Michelangelo—Carrer did valuable work. From 1836 to 1838 he superintended the publication of *Il Novellista Contemporaneo Italiano e Straniero*. Consult Sartorio's *Luigi Carrer*.

**Carrera, José Miguel de** (1785-1821), Chilean soldier, was born in Santiago de Chile. At the outbreak of the Chilean revolution he returned to that country and became a member of the junta. In December, 1811, he deposed the newly formed congress and proclaimed himself president and dictator of Chile; but two years later was himself deposed in favor of Bernardo O'Higgins. He and his two brothers, Juan and Luis, were captured and executed by the Spaniards at Mendoza in 1821.

**Carrère, John Mervin** (1858-1911), American architect, was born in Rio de Janeiro of American parents. In 1884, with Thomas Hastings, he formed the distinguished architectural firm of Carrère & Hastings in New York City. This firm built the New York Public Library, the Memorial Buildings at Yale, the Carnegie Institution at Washington; and were the consulting architects for the Office Buildings of Congress at Washington. Carrère was killed in an automobile accident.

**Carrhæ**, called Haran in the Bible, a city of Osroene, in Mesopotamia, where Crassus died, after having been defeated by the Parthians, in 53 B.C.

**Carriages**, wheeled vehicles of various types, intended for the conveyance of passengers. The earliest carriages were probably constructed for warlike purposes; but at the period as remote as the time of Joseph, carriages were used also for royal pageants. Among the Greeks, chariot races formed an important feature in the Olympic Games;

the Romans had two, three, and four horse chariots; and according to Herodotus, the Scythians had a covered chariot the top of which was removable, and capable of being used as a tent. In modern times, the earliest record belongs to about the year 1280, when Charles of Anjou entered Naples, and his queen rode in a caretta or a small decorated car.

In Great Britain carriages came into general use much later than on the Continent, the litter being the chief state vehicle until the 16th century. The early carriages were heavy, lumbering structures, necessarily of considerable strength and solidity because of the wretched roads. Later the coach body was suspended by leather straps to insure ease of motion, and still later these straps were attached to C springs, an arrangement even now used in coaches proper. In the United States the earliest carriages were brought from England, and were practically all intended for public conveyances. The carriage built for General Washington by Clarke of Philadelphia, is an excellent specimen of the later and more elegant private carriage of the 18th century. See COACHING. Consult R. Strauss' *Carriages and Coaches* (1912).

**Carriages, Gun.** See **Guns**.

**Carrier, or Common Carrier**, in the legal sense, is one who offers to convey passengers or goods for hire. Unless all the available space in his conveyance is already taken up, he is not entitled to refuse any one who offers himself as a passenger, or his property as goods for transit. Exception is made, however, where the intending passenger is in a condition to render himself objectionable to other passengers or spoil the furnishings of the conveyance, or where the goods offered are dangerous in their nature or improperly packed and secured. The carrier has a right to demand prepayment of the hire, and has a lien on goods for such charges as have not already been met.

All modern systems of law, following that of Rome, impose special responsibilities on carriers. At common law a carrier is absolutely liable for any loss or injury that may occur in the course of transit, otherwise than by act of God—storms and earthquakes—or of the public enemies. By the Interstate Commerce Acts Congress has forbidden carriers to discriminate between persons or localities in the conveyance of passengers or goods from State to State, and has compelled them to charge only such rates as are fair and rea-

sonable; and the Interstate Commerce Commission has power to hear complaints affecting interstate transit, and provide remedies for the same. See **INTERSTATE COMMERCE COMMISSION**. Each State has full control of the means of conveyance within its own jurisdiction, including the power to check abuses of the nature just mentioned. Oversea transit is subject to the jurisdiction of the Federal Government. See **BILL OF LADING**.

**Carrier, Jean Baptiste** (1756-94), member of the French National Convention, was born at Yolet, Auvergne. He took an active part in the formation of the Revolutionary Tribunal, voted for the death of the King, and assisted in the overthrow of the Girondists. At Nantes, whither he was sent on a mission against the moderates in 1793, he found ample means for indulging his insatiable thirst for human blood. The utter defeat of the Vendéans had filled the prisons with captives, and Carrier proposed and carried a resolution for murdering the unhappy prisoners *en masse*. Even Robespierre was offended by the enormities committed, and recalled Carrier, who boldly justified his own conduct before the Convention. The fall of Robespierre, was soon followed by outcries against Carrier; and he perished under the guillotine.

**Carrière, Eugène Anatole** (1849-1906), French painter, born at Gournay, Seine-Inférieure. He was a great painter of maternity. A consummate draughtsman, he painted as a sculptor works; and in order to emphasize the inner life, he isolated the figure by enveloping it in a soft haze. His famous *Maternity* (1892) is in the Luxembourg at Paris, *The Young Mother* (1878) at Avignon, and *The Sick Child* (1886) at Montargis.

**Carriere, Moriz** (1817-95), German philosopher, born at Griedel, near Butzbach, in Hesse-Darmstadt. His philosophy is an attempt to reconcile deism and pantheism, and maintains the ultimate triumph of the beautiful and the good. His works embrace: *Aesthetik* (1884); *Die Kunst . . . und die Ideale der Menschheit* (1876-86); *Die Sittliche Weltordnung* (1891).

**Carrington, Henry Beebe** (1824-1912), American soldier and historian, born at Wallingford, Conn. Among his publications are: *Russia as a Nation* (1849), *American Classics, Battles of the American Revolution* (1903), the best work on the subject.

**Carrington, Hereward** (Hubert Lavington, (1880- ), English author, born in Jersey. Channel Islands. As a member of

the Society for Psychical Research, in London, he investigated and reported on various mediums. He has written many books, a few of which are: *Hindu Magic* (1913); *The Boys Book of Magic* (1920), and *The Story of Psychic Science* (1930).

**Carrión Crow** (*Corvus corone*), a European crow, a close ally of the hooded crow (*Corvus cornix*). In the United States the name is given to a black vulture (*Catharista atrata*), smaller than the turkey buzzard, which performs scavenging work in the towns along the Gulf of Mexico.

**Carrión Flowers**, or **Stapelias**, are members of a genus of S. African succulent plants belonging to the order Asclepiadæ. They derive their popular name from the odor of their flowers, which are usually showy and frequently beautiful. In the United States the name is given to a species of Smilax (*Smilax herbacea*). It is a climbing, thornless plant, with evil-smelling, globular heads of greenish flowers.

**Carroccio**, a large chariot or van on which, in the middle ages, the banner of an Italian town was carried into battle. It was painted red, and had in the middle a red pole with a golden apple at the top, into which the flag was fixed. This was regarded as the palfadium of the city. Its capture meant defeat and humiliation.

**Carroll, Charles**, of Carrollton (1737-1832), American patriot, born at Annapolis, Md. He was educated in Europe, returned to Md. in 1765, and in the pre-Revolutionary controversies between the British government and the American colonists became one of the leaders of the latter. During the Revolutionary War he was a member of the Continental Congress, 1776-79, signing the Declaration of Independence, Aug. 2, 1776; and in 1776, with Benjamin Franklin and Samuel Chase, was sent by the Continental Congress to gain the good-will and, if possible, the coöperation of Canada, the mission, however, accomplishing nothing. See Rowland's *Life of Charles Carroll of Carrollton, with his Correspondence and Public Papers* (1898).

**Carroll, Henry King** (1848-1931), American journalist and author, was born at Dennisville, N. J. From 1876 to 1898 he was religious and political editor of the *Independent*. He published *The Religious Forces of the United States*, and various government reports and other papers.

**Carroll, John** (1735-1817), American R. C. prelate, a cousin of Charles Carroll of Carrollton, was born at Upper Marlborough,



1 Lion and Lioness  
3 Cheeta

## FOUR GREAT CATS

2 Canada Lynx  
4 Tiger





Md. He took an active part in the Revolution, was commissioner to the Canadian Roman Catholics (though not successful in this mission). On the establishment of the bishopric of Baltimore, he was chosen first Bishop of the diocese, and was consecrated in England (1790). He was sole bishop in the U. S. for many years, and in 1808 he was created archbishop. He founded Georgetown College. See *Shea's Life* (1888).

**Carroll, Lewis**—pseudonym of **Charles Lutwidge Dodgson** (1832-98)—English mathematician and writer of fairy tales, born at Daresbury, Cheshire. His mathematical speculations were ingenious rather than profound. He delighted in the invention of games and puzzles. He published *Alice's Adventures in Wonderland* in 1865. The verbal felicities and whimsical logic of this, aided by Tenniel's clever drawings, proved attractive both to children and to their elders. It was followed by *Through the Looking-glass, and what Alice found there*, 1871, and by some other attempts of less account. Lewis Carroll was also responsible for a good deal of humorous verse. See S. D. Collingwood's *The Life and Letters of Lewis Carroll* (1898); Isa Bowman's *The Story of Lewis Carroll* (1899).

**Carronade**, originally called 'smasher,' a short piece of ordnance in use at sea in the latter days of wooden ships.

**Carron Oil**, a mixture of equal parts of lime-water and linseed oil, is used as an application for burns. See **BURNS**.

**Carrot**. The carrot derives its origin from the wild species *Daucus Carota*. It is a member of the order Umbelliferae. In order to grow well, carrots should be provided with a light, moderately rich, deeply cultivated soil. The long White Belgian and Orange are good field sorts. Carrots make excellent stock feed, especially for horses and dairy cows, but the cost of growing is considerably greater than for mangles.

**Carruthers, Robert** (1799-1878), Scottish journalist, born at Dumfries. In 1828 he became editor of the *Inverness Courier*, and conducted it until his death. Carruthers's publications include editions of Pope's poems (1853 and 1858); *The Life of Alexander Pope, with Extracts from his Correspondence* (1857). He collaborated with Robert Chambers on his *Cyclopaedia of Eng. Lit.* (1843-4), and to the eighth edition of the *Encyc. Brit.* contributed several biographies. See *Memoir of William and Robert Chambers* (1884).

**Carruthers, William A.** (c. 1800-c. 50), American novelist, was born in Virginia. His works of fiction include *The Cavaliers of Virginia* (1832) and *The Knights of the Horse-Shoe* (1845).

**Carson, Christopher** (1809-68), American hunter, scout, and frontiersman, generally known as Kit Carson, born in Madison co., Ky. At the age of seventeen he became a hunter, trapper, and professional guide. He acted as guide to Frémont in his exploration in the Rocky Mts., 1842-4, served under him during the conquest of California, 1846-7, conducted parties overland to California during the rush of 1849-50 to the newly-discovered gold fields, and, settling in New Mexico in 1854, became U. S. Indian agent at Taos, and was breveted brigadier-general for services rendered there, chiefly as a scout, during the Civil War. He died at Fort Lynn, Col. See *Lives* by Burdett (1859) and Peters (1874).

**Carson City**, cap. of Nev., county seat of Ormsby co. The chief industries are agriculture, stock raising and mining; p. 3,082.

**Carstares, William** (1649-1715), Scottish statesman and divine, was born near Glasgow. In 1674 he was arrested in England, for supposed complicity in the authorship of a pamphlet on *Scotland's Grievances*, was thrown into Edinburgh Castle, and there he lay untried until his release in 1679. From that time onward he was one of the principal agents in bringing about the advent of the Prince of Orange. Returning to Holland, Carstares was appointed second minister of the Scottish congregation at Leyden and chaplain to William. He accompanied the Prince to England in 1688, and William thenceforward relied implicitly on him so far as the government of Scotland was concerned. The revolution settlement which established the Scottish Presbyterian Church was chiefly the result of his efforts. He continued in the office of royal chaplain under Anne and George I., and was four times elected moderator of the General Assembly (1705, 1708, 1711, 1715). He was an active promotor of the union. Consult R. H. Story's *Life of Carstares*, and *The Carstares State Papers*.

**Carstens, Asmus Jacob** (1754-98), Danish painter, the initiator of the classical reaction in Germany, was born near Schleswig. Influenced by Winckelmann, he conceived an admiration for Hellenic ideals, and rebelled against the rococo school and academic traditions.

**Cartagena**, city, Spain, in the province of

Murcia; 240 m. s.e. of Madrid. It is a strongly fortified town, the chief naval harbor of Spain; p. 113,468. Cartagena was founded by Hasdrubal in 221 B.C., on the site of an ancient Iberian settlement. It was conquered by Scipio in 209 B.C., and for centuries was an important commercial port. It came into Spanish possession in the 13th century. In the war of the Spanish Succession it was taken by an English-Dutch fleet (1706). During the political troubles in the latter part of the reign of Isabel II., Cartagena was one of the most stubborn of the revolting cities; it was forced to surrender, after a long siege, in 1874.

**Cartagena**, seaport town, Colombia, capital of the department of Bolivar, is situated on an island in Cartagena Bay. It is one of the oldest settlements in Spanish South America and still retains much of its old-time appearance; p. 112,410. Cartagena was founded by Pedro de Heredia in 1533. It was frequently sacked and plundered, notably by Drake in 1585, and by the French in 1697. In 1815 it was the headquarters of the South American Inquisition.

**Cartago**, town, Colombia, capital of the province of Cartago, near the Rio Vieja; 130 m. w. of Bogota; p. 14,750.

**Cartago**, town, Costa Rica, Central America, in the province of Cartago. It lies dangerously near the base of the active volcano of Irazu or Cartago (11,200 ft.). Cartago was the capital city until 1823. P. 100,725.

**Carte**, a position in fencing, in which the inside of the hand is turned upward and the point of the foil is toward the adversary's right breast.

**Carte, Richard d'Oyly** (1854-1901), London theatrical impresario who fostered the collaboration of Sir Arthur Sullivan and Sir William S. Gilbert and produced their series of light operas. In 1879, to protect the copyright on their works he gave *Pinafore* its world premiere in New York and later presented *The Pirates of Penzance* there. His son, Rupert, brought the Gilbert and Sullivan repertoire to New York again in 1934 for an outstandingly successful season, from the company's own Savoy Theater in London.

**Carte, Thomas** (1686-1754), English historian, was born in Clifton-upon-Dunsmore. Having refused to take oaths of allegiance to George I., and being suspected of complicity in the Atterbury conspiracy in 1722, he was forced to escape to France, where he lived under the name of Phillips. He returned

to England in 1728 and devoted himself to writing.

**Carte Blanche**, an expression meaning unlimited authority. Literally, it is a blank paper, duly signed, intrusted to a person to fill out at his discretion.

**Cartel**, 1. In warfare, an agreement between fighting nations to regulate intercourse. 2. A ship commissioned in wartime to arrange intercourse. 3. A combination among producers relative to prices and output. In World War II the U. S. government brought suit against various private business corporations for making illegal international agreements to restrict trade, and charged that they conspired to divide with foreign companies the markets of the world.

**Carter, Elizabeth** (1717-1806), English poet and scholar, was born in Deal. She translated *Epictetus*, and published two volumes of *Poems*.

**Carter, Franklin** (1837-1919), American educator, was born in Waterbury, Conn. In 1881 he was elected president of Williams College, a position which he occupied until 1901.

**Carter, Henry**, the real name of Frank Leslie.

**Carter, Henry Rose** (1852-1925), American public health official, was born in Caroline co., Va. In 1879 he entered the U. S. Public Health Service as assistant surgeon, becoming assistant surgeon general in 1915. He has devoted himself particularly to sanitation in connection with yellow fever and malaria. He inaugurated a quarantine system in Cuba in 1899-1900, was director of hospitals in the Panama Canal Zone (1904-09), a member of the Rockefeller Yellow Fever Commission to Central and South America (1916), and sanitary advisor of the Peruvian Government (1920-21).

**Carter, Howard** (1873-1939), British archaeologist and Egyptologist, was born in Swaffham, Norfolk. He conducted extensive explorations in the Valley of the Kings, making many valuable discoveries, and in 1917 joined Lord Carnarvon in his Theban explorations which led to the finding (1923) of the tomb of Tut-ankh-amen. In 1924 he visited the United States, giving a series of illustrated lectures on his discoveries.

**Carter, James Coolidge** (1827-1905), American lawyer, was born in Lancaster, Mass. In 1892 he was named by President Harrison, with Edward J. Phelps and Henry W. Blodgett, counsel to present the claims

of the United States before the Bering Sea tribunal which met in Paris the following year.

**Carter, Jesse Benedict** (1872-1917), American educator, was born in New York City. He was director of the American School of Classical Studies at Rome (1907-12) and director of the American Academy at Rome from 1913 until his death. His publications include *De Deorum Cognominibus* (1898); *Elegiac Poets* (1900); *The Religious Life of Ancient Rome* (1911).

**Carter (Mrs.) Louise Leslie** (1862-1937), American actress, was born in Lexington, Ky. After two years' study under David Belasco she won marked success in *The Heart of Maryland* (1895), *Zaza* (1898), *Du Barry* (1901), and *Adrea* (1904). She was absent from the stage from 1917 to 1921, when she reappeared with John Drew in *The Circle*, and later in moving pictures.

**Carter, Samuel Powhatan** (1819-91), American naval officer and soldier, was born in Carter co., Tenn. He was commissioned brigadier-general of volunteers in May 1862, and lieutenant-commander in the navy in July 1862. He was commandant of the U. S. Naval Academy from 1869 to 1872, retired in 1881, and was made a rear-admiral on the retired list in 1882.

**Carter, Thomas Henry** (1854-1911), American legislator, was born in Scioto co., Ohio. He was U. S. Senator (Rep.) for the terms 1895-1901 and 1905-11. He was president of the U. S. commissioners of the Louisiana Purchase Exposition at St. Louis and was a member of the International Boundary Commission of the United States and Canada (1911).

**Carteret, Sir George** (c. 1613-80), English royalist, governor of the island of Jersey. After the Restoration he held several offices under Charles II., of which the most important was that of treasurer of the navy (1661-7). For his loyalty and services to the crown he was, in 1650, granted 'a certain island and adjacent islets in America in perpetual inheritance, to be called New Jersey, and held at an annual rental of £6 a year to the crown'; and in 1663 he appears as one of the original proprietors of Carolina. In 1664, the Duke of York assigned to him, in conjunction with Lord Berkeley, the land between the Hudson and the Delaware, to be called, in honor of Carteret, New Jersey. The district was divided in 1676, Carteret retaining the part known as East Jersey, which

was bought from his widow in 1682 by William Penn and eleven other Quakers.

**Carteret, John, Earl Granville** (1690-1763), British statesman, succeeded to the peerage on the death of his father in 1695. In 1719 he was appointed ambassador-extraordinary to Sweden and was instrumental in concluding peace between Sweden, Prussia, and Hanover. He was made a secretary of state in 1721, but resigned, and in 1724 became lord-lieutenant of Ireland, a position he held with considerable popularity for six years. From 1730 until Walpole's resignation in 1742, Carteret did not cease to oppose him, and upon his resignation the latter was again made a secretary of state. He became Earl Granville on the death of his mother in 1744, and soon afterward resigned his secretaryship. He still enjoyed the King's favor, however, and in 1750 was elected a Knight of the Garter.

**Carteret, Philip** (?—1796), British rear admiral and explorer, attained the rank of commander in 1766. In that year he was sent to the southern hemisphere to complete the work begun by Byron's expedition two years earlier. He discovered Pitcairn Island, Queen Charlotte Islands, New Ireland, St. George's Channel, Sandwich, Byron, New Hanover, and many other small islands, all in the South Pacific. In 1794 he retired from active service. His 'Journal' was published in Hawkesworth's *Voyages* (1773).

**Carteret, Philip** (?—1682), brother of Sir George Carteret was appointed by his brother and by Sir John Berkeley, lords proprietors of New Jersey, first governor of that province. He was governor of the province from 1665 until its division in 1676, after which he was governor of East Jersey until his death.

**Cartersville**, city, Georgia, county seat of Bartow co., 48 m. n.w. of Atlanta; p. 7,270.

**Carthage** (Lat. *Carthago*; Gr. *Karchedon*), celebrated ancient city on the northern coast of Africa; about 20 m. n.e. of modern Tunis. According to legend, it was founded by Dido about 850 B.C., on a promontory at the northeastern extremity of the Bay of Tunis. The new foundation (Carthage means 'new city') grew and prospered, soon outstripping Utica, the earliest Phœnician colony in Africa. At the time of its destruction (146 B.C.), the population of Carthage numbered 700,000, many of whom were of Libyan descent. The constitution was oligarchic and

there were two kings, elected annually. Originally Carthage was little more than a trading station, maintaining peaceful relations with its neighbors, but as it grew in wealth



*The Site of Ancient Carthage*

and power it was able to subjugate and annex other Phœnician colonies. The North African coast westward as far as the Atlantic was included in its dominion; and at the

of this first struggle. To compensate for the losses suffered, he, with his son Hannibal and his son-in-law and successor Hasdrubal, developed the Carthaginian power (236-221 B.C.) in Spain. In 218 B.C. Hannibal began the Second Punic War, invaded Italy, and won several great battles (Trebia, Trasimene, Cannæ). He failed, however, to disintegrate the confederacy of Rome and, leaving Italy in 203, was defeated by Scipio at Zama, Africa, in 202. By this defeat Carthage lost Spain, and indeed all her possessions outside her own immediate territory, and became the vassal state of Rome. A Third Punic War, declared by the Romans in 149 B.C., on a flimsy excuse, resulted in the ultimate destruction of Carthage by Scipio Æmilianus in 146 B.C., and her territory became the Roman province of Africa. In later time a Roman colony founded at Carthage by Julius Cæsar, and developed by Augustus,



*Remains of a Roman Theatre at Carthage.*

height of its power, in the third century B.C., it held also the western half of Sicily, Sardinia, the Balearic Isles, and most of Spain. Thus, at its greatest extent, the empire of Carthage encompassed nearly the whole of the Western Mediterranean. The history of Carthage, so far as it is known to us is chiefly the history of her struggles with Greece and Rome.

In the First Punic War (264-241 B.C.) Carthage lost Sicily and soon afterwards Sardinia. Hamilcar was the Carthaginian hero

became once more the chief city of Roman Africa, and was the seat of several ecclesiastical (Christian) synods and councils. The Vandals captured it in 439 A.D., and held it until Belisarius took it and destroyed their power in 533. The Arabian conquerors finally destroyed the city in 698 A.D.

The first important excavations at Carthage were undertaken in 1837 by de la Mollé. He was followed by other explorers, of whom the most notable was Father Delattre, but the work was for the most part

conducted with little systematic plan. In 1921 Count de Porok, a French archæologist, began work in Carthage, and this work has been carried on by him and by American archæologists. As a result of these discoveries archæologists are convinced that the ancient Punic city and the Roman Carthage occupied slightly different sites. Consult Church's *Carthage* in the 'Story of the Nations Series'; N. Davis' *Carthage and her Remains*; Boissier's *Afrique Romaine*; Petrie's *Tunis, Kairouan and Carthage*; Grant's *Studies in North Africa* (1921).

**Carthage**, city, Illinois, county seat of Hancock co., 13 m. e. of Keokuk. It is the seat of Carthage College; p. 3,214.

**Carthage**, city, Missouri, county seat of Jasper co., 56 m. w. of Springfield. In the Civil War Carthage was the scene of an indecisive battle, when on July 5, 1861, for several hours, General Sigel, with 1,500 men, held in check 3,500 Confederates under Jackson and Price; p. 11,188.

**Carthagena.** See **Cartagena**.

**Carthago Nova.** See **Cartagena**.

**Carthamin** ( $C_{14}H_{10}O_7$ ), a coloring matter extracted from the safflower (q.v.) (*Carthamus tinctorius*) by means of alkaline solutions. It is a red powder, soluble in alkaline solutions, and is used as a component of rouge.

**Carthusians, Order of**, a Roman Catholic monastic order founded in 1086 by St. Bruno, who with six followers retired to the lonely spot known as La Chartreuse, near Grenoble, and there built three small huts and a tiny chapel which later developed into the great monastery of La Grande Chartreuse (see CHARTREUSE). In 1170 the order received recognition by the Pope, and after that spread rapidly through Italy, Spain, and Switzerland. It reached England in 1180, where the name was corrupted to Charter House.

The Carthusians are divided into fathers and lay brothers. Asceticism, fasting, prayer, reading, and manual labor, combined with an almost absolute retirement, and an abstinence from speech except when at church or during their weekly walk, are the characteristics of the brotherhood. The Carthusian nuns, dating from the 12th century, observe similar but somewhat less rigid rules. At present there are about 25 Carthusian monasteries. Consult Bontrais' *The Monastery of the Grand Chartreuse*.

**Cartier, Sir George Etienne** (1814-73) Canadian statesman, was born in St. An-

oine, Quebec. From 1858 to 1862 he was associated with Sir John Macdonald in the Cartier-Macdonald ministry. During this time he carried through the codification of the civil laws and laws of procedure of Lower Canada, a work of the utmost value, took an aggressive part in the building of the Grand Trunk Railway, and was one of the leaders in the movement for Confederation.

**Cartier, Jacques** (1494-1557), famous French explorer, was born in St. Malo. Having gained a reputation as a fearless navigator, he was chosen to head an expedition to America and in 1534 he reached Newfoundland and penetrated the St. Lawrence as far as Anticosti Island. The following year he sailed up the St. Lawrence to the Indian village of Hochelaga, where later was to be the city of Montreal—a name originally given by Cartier, in the form 'le Mont Royal,' to a neighboring mountain. He also gave the name St. Lawrence to a small bay opposite the island of Anticosti. In 1541, having been appointed 'captain-general' of a new expedition, Cartier was sent on ahead and established a settlement, which he called Charlesbourg-Royal, on the St. Lawrence, at the mouth of the Cap-Rouge. The settlers became so discouraged and homesick, that in the spring of 1542 Cartier took them back to France, refusing to return when ordered to do so by Roberval. For his discoveries and explorations he received a patent of nobility, and after 1542 lived in St. Malo until his death. Cartier's *Voyages* may be found, in English in Pinkerton's *General Collection of Voyages and Travels*. Consult, also Parkman's *Pioneers of France in the New World*; Winsor's *Cartier to Frontenac*; Baxter's *Jacques Cartier*.

**Cartilage**, the gristle or elastic substance in which bone is formed, and which remains permanently as the covering of the ends of bones in joints. Cartilage is white or bluish white, and semi-transparent. Three varieties are generally described: Hyaline, Fibrocartilage, and elastic cartilage. All bones are preformed in cartilage, with the exception of some of those of the head.

**Cartilaginous Fishes**, that sub-class of fishes in which the skeleton is cartilaginous and the teeth and scales (with the exception of slight hints in the vertebral column) are the only bony structures. It includes the sharks and rays. See ELASMOBRANCHS.

**Cartography.** See **Maps and Map Making**.

**Cartomancy**, a form of fortune telling by cards. See DIVINATION.

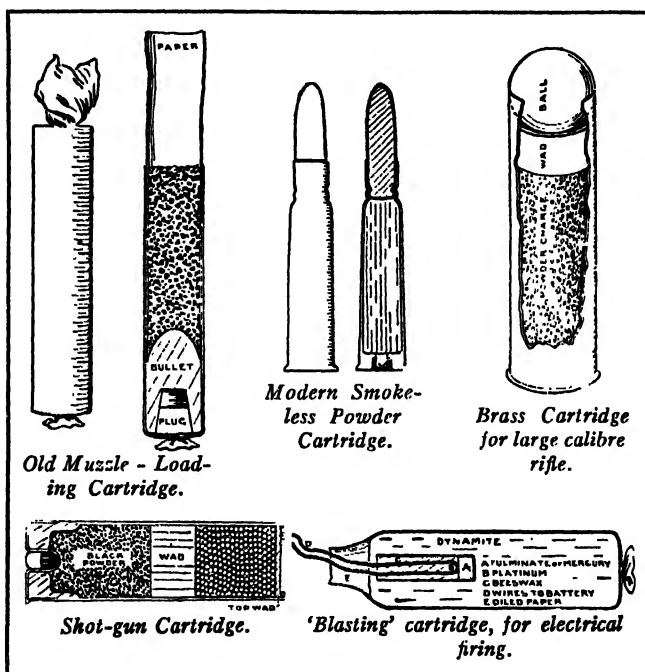
**Carton**, R. C. (1853-1925), English actor and dramatist, whose real name was R. C. Critchett, was born in London. He appeared as an actor in 1875 in *The Sea of Ice*, and after various successful rôles retired from the stage in 1885 to devote himself to writing.

**Cartoon**, originally a full-sized drawing upon strong paper of a design to be carried out in oil paint, fresco, tapestry, stained glass, or mosaic. Of recent years the term has been used to denote the semi-satiric drawings, dealing with political or social events,

usually intended for an inscription or device.

**Cartridge**, a military term signifying, in its present use, one complete round of ammunition for a small arm (rifle, pistol, carbine, shotgun, etc.). The first cartridges were made for muzzle-loading guns, and consisted of the powder and the ball or shot tied together in one bundle. The soldier tore off the paper from the powder end of this cartridge, poured the powder into the barrel, rammed home the ball and paper surrounding it, put on a percussion cap and fired.

Modern cartridges for military use consist of a brass case, an oblong lubricated bullet



Types of Cartridges.

which are published in newspapers and other periodicals. In the latter sense it is now also applied to the caricatures which are issued as separate prints. See CARICATURE.

**Cartouch**, a canvas case in which cartridges are conveyed from the ammunition box to the gun in a field battery, in order to keep them dry. The name signifies also the pouch box carried by soldiers for holding rifle cartridges; but bandoliers in many services have now superseded cartridge boxes.

**Cartouche** (Fr. 'roll of paper'), an architectural ornament resembling a roll of paper,

of lead and tin composition with a cupronickel jacket, a primer of mercury fulminate, and a charge of smokeless powder. Such a cartridge is called a *ball cartridge*, in contradistinction to one similar in all respects, but having a bullet of paper which is called a *blank cartridge*. There are also *dummy cartridges* containing no powder or primer, and a *multiball cartridge*, containing two or more round balls used for short ranges only and never in actual war. See AMMUNITION; ARTILLERY; GUNS; PROJECTILES; RIFLE.

**Cartwright**, Edmund (1743-1823), Eng-

lish inventor, was born in Marnham in Nottinghamshire and became rector of a church in Leicestershire, where he made agricultural experiments on his glebe land.

**Cartwright, John** (1740-1824), English political reformer, elder brother of Edmund Cartwright, was born in Marnham in Nottinghamshire. His sympathies were with the American colonies during the Revolutionary War; he resigned his magistracy and declined to fight with Lord Howe's command in America, and wrote, in 1774, *American Independence, the Glory and Interest of Great Britain*, and in 1775, *A Letter to Edmund Burke, controverting the Principles of American Government laid down in his lately published speech on American Taxation*.

**Cartwright, Peter** (1785-1872), American Methodist clergyman, known as the 'backwoods preacher,' was born in Amherst co., Va.

**Cartwright, Sir Richard John** (1835-1912), Canadian statesman, was born in Kingston, Ontario. He was minister of finance under Mackenzie; Minister of Trade and Commerce in Sir Wilfrid Laurier's cabinet; and acting Premier in 1897, and again in 1907. He proposed and was a member of the Anglo-American Joint High Commission that met in Quebec in 1898; was knighted in 1879.

**Cartwright, Thomas** (1535-1603), English Puritan divine, was born in Hertfordshire.

**Cartwright, William** (1611-43), English divine, poet, and dramatist, was born in Northway, Gloucestershire. His collected works, *Comedies, Tragi-Comedies, with Other Poems* were issued in London in 1651.

**Carucate**, or **Carrucate**, a term of mediæval origin denoting a 'plough-land'—as much land as could be tilled in one year by a single plough drawn by eight oxen.

**Carúpano**, seaport, Bermudez, Venezuela. It is a commercial centre and exports coffee, cocoa, sugar, and brandy; p. 12,000.

**Carus, Julius Viktor** (1823-1903), German zoölogist, was born in Leipzig. His many books include *Prodromus Faunæ Mediterraneæ* (1884-93), and *System der Thierischen Morphologie* (1853).

**Carus, Karl Gustav** (1789-1869), German physiologist and physician, was born in Leipzig; was appointed court physician (1827), and was elected president of the Imperial Academy (1862). Among his numerous works on anatomy and physiology may be mentioned *Gründsuge der vergleichenden*

*Anatomie* (1828), and *System der Physiologie* (1838-40).

**Carus, Marcus Aurelius**, emperor of Rome (282-283 A.D.). After repelling a Sarmation invasion into Illyricum, he marched against the Persians, and over-ran Mesopotamia, capturing Selucia and Ctesiphon. Just as he was about to extend his march beyond the Tigris, he died suddenly.

**Carus, Paul** (1852-1919), American author, was born in Ilseburg, Germany. His works include *The Age of Christ; God, an Enquiry into Man's Highest Ideals; Nietzsche and Other Exponents of Individualism*; and a number of books on Chinese religion and philosophy.

**Caruso, Enrico** (1873-1921), Italian operatic tenor, was born in Naples, made his *début* at Naples in 1894, and scored his first great success as Alfredo in *Traviata* in the same city in 1896. His American *début* was made in 1903, in *Rigoletto*, at the Metropolitan Opera House, where he continued to sing until stricken by the illness that resulted in his death. He died in Naples on Aug. 2, 1921, and at the order of King Victor Emmanuel was buried with special obsequies from the royal basilica of San Francesco di Paola in Naples.

**Carvel**, or **Caravel** a light, short, masted ship with a square poop, formerly used in Spain and Portugal; also a small vessel once used by the French for herring fishing.

**Carver, George Washington** (1864-1943), American scientist and educator, born in Mo. of slave parents. He has been called the 'first and greatest chemurgist.' Read Holt's *George Washington Carver* (1943).

**Carver, John** (c. 1575-1621), leader of the Pilgrims, born in England. He was the first governor of Plymouth Colony.

**Carver, Jonathan** (1732-1780), American traveller, was born in Conn. In his *Travels through the Interior Parts of North America* (1778), he claimed to have penetrated beyond the Great Lakes.

**Carving** is the art or act of cutting ornamental or naturalistic forms in stone or marble, ivory or wood. Carving, is one of the oldest of the arts, and among half-civilized or savage peoples it is usually found in greater perfection than flat-colored decoration. The carved or incised bones found in prehistoric caves in France are perhaps the oldest art objects known and in Egypt and Nineveh carved work in ivory dates from early times. In Greece ivory was used for many ornamental purposes, and a number



of famous statues were executed in ivory and gold. The mediæval period has left many fine pieces, and of these several of the most beautiful and spirited are French. The Early Renaissance produced numerous fine ivory carvings of a similar kind, but more delicate in treatment, more complete in form, and showing classical influences. Ivory is also a favorite material in India, China, and Japan; but while Eastern carvers show great skill and possess a sense of the grotesque, their figure work is usually debased. Wood carving is probably of even greater antiquity than ivory carving, the wooden sculpture of Egypt being the earliest that survives; but, although wood carving was practised in Greece and Rome it is not until the mediæval period that authentic examples are again available. In churches, particularly in the north of Europe, statuettes, shrines, and elaborate altarpieces, carved in wood, gilded and colored, were common, and stall-work and screens were often both elaborate and fine. In Italy and in France, where Italian influences were strong, carved furniture was also in fashion. During the late 17th century Grinling Gibbons a Dutchman, introduced into England a style of wood carving which had great and persistent influence there.

**Cary, Alice** (1820-71), and **Phoebe** (1824-71), American poets, sisters, were born in the Miami Valley, near Cincinnati, and educated themselves at home. Alice's writings include *The Clovernook Papers* (1851-3), *Lyra and Other Poems* (1853), *Ballads, Lyrics, and Hymns* (1866), and several works of fiction. Phoebe's was a minor note; she published *Poems and Parodies* (1854), *Poems of Faith, Hope, and Love* (1868).

**Cary, Annie Louise** (1842-1921), American singer, born at Wayne, Me. On the completion of her musical education she made her début in Italian Opera at Copenhagen, and sang for several years in various cities of Northern Europe and America. She retired to private life on her marriage, 1882, to Charles Monson Raymond, a New York banker.

**Cary, Archibald** (c. 1730-86), American patriot, was born in Virginia, and served in the Virginia House of Burgesses for many years.

**Cary, Henry Francis** (1772-1844), translator of Dante, born at Gibraltar.

**Caryatides**, an architectural term signifying those draped female figures, in Hellenic buildings usually of the Ionic style, which supply the place of pillars.

**Caryocar.** A genus of trees, natives of tropical America; celebrated for the kernels of their drupes, which are embedded in a mealy pulp, and consist of a delicious white, oily jelly-like mass, covered by a membrane. An oil is extracted from them which is almost as good as that of olives.



*Caryatid, from the Erechtheum, Athens.*

**Caryophyllaceæ**, an order of flowering plants characterized by the pistil being syncarpous, the leaves entire and opposite, placenta free central, the stem swollen at the nodes, calyx and corolla each of five parts.

**Caryota**, a genus of spineless palms with bipinnate leaves, the genus which is sometimes known as the fish-tail palms.

**Casa, Giovanni Della** (1503-56), Italian writer, born in the Mugello valley, near Florence. His fame rests chiefly on the little book, *Il Galateo, ovvero de' Costumi* (written between 1551-5), which presents an admirable picture of the court manners of the Italian renaissance.

**Casabianca, Louis de** (1775-98), French naval officer, born in Corsica; took part in the American Revolutionary War; was mortally wounded at Aboukir, and perished with his burning ship, his little son declining to desert him.

**Casablanca**, or **Dar-el-Beida**, largest seaport of Morocco, N. Africa; p. 551,322; founded by the Portuguese 1468; occupied by the French 1907; scene of the fourth meeting of Prime Minister Churchill and Pres. Roosevelt, Jan. 16-26, 1943, at which meeting the Italian invasion was planned. See **United States**; **UNITED NATIONS CONFERENCES**.

**Casa Grande**, vil., Pinal co., Ariz.; known for its famous ruin.

**Casale**, or **Casale Monferrato**, fort. tn. and episc. see, prov. Alessandria, Italy. The cathedral dates from the 8th and 12th centuries. There are some other interesting churches and private palaces; p. 20,540.

**Casanova**. (1.) **Giovanni Giacomo de Seingalt** (1725-98), Venetian adventurer. He travelled from capital to capital in Europe, frequenting the most aristocratic society, and leading a generally rakish life. His *Memoirs*, published after his death, depict the manners of his time. (2.) **GIOVANNI BATTISTA** (1722-95), his brother, was a painter, and became professor in the Academy of the Fine Arts, Dresden. (3.) **FRANCESCO** (1730-1805), another brother, born in London, was also a painter. His pictures exist in Rouen, Nancy, and other French towns; and his *Ferry Boat* hangs at Dulwich College, London.

**Casas Grandes**, tn., Chihuahua state, Mexico. Primitive ruins are numerous in the locality. It was discovered by the Spaniards in 1660.

**Casati**, **Gaetano** (1838-1902), Italian explorer, born at Lesmo; undertook a journey to the Sudan, during which he explored the region of the river Welle-Makua, and (1881) met the German traveller Junker. He published *Dieci Anni in Equatoria e ritorno con Emin Pascha* (1891).

**Casaubon**, **Isaac** (1559-1614), Swiss classical scholar, born at Geneva, became royal librarian at Paris; but on the death of Henry IV., who protected him, his pronounced Protestantism made it advisable for him to leave Paris and he settled in London. He was appointed prebendary of Canterbury and Westminster, and was buried in Westminster Abbey. Besides publishing editions of *Athenæus* (1600), *Aristotle* (1590) and other classical writers, Casaubon was the author of *De Satirica Græcorum Poesi et Romanorum Satira* (1605) and other works. Casaubon's son **MÉRIC CASaubON** (1599-1671), was also a distinguished scholar. appointed professor of theology at Oxford. He published a defence of his father, wrote several Latin works, and edited Terence *Marcus Aurelius, Epictetus*, etc.

**Casca**, **Publius Servilius**, one of the murderers of Cæsar. He fell in the battle of Philippi (42 B.C.).

**Cascade**, mountain range in n.w. of the United States, traversing, with a n. and s. trend, the states of Washington, Oregon, and

N. California. With a general summit elevation of from 6,000 to 7,000 ft., rising to 8,000 ft. or more in N. Washington, the range bears on its crest or flanks many extinct volcanoes.

**Cascara Bark**, or **Cascara Sagrada**, or **Chittam-bark**, is obtained from a small tree which belongs to the natural order Rhamnaceæ, and grows abundantly in the western United States. The fluid extract is prepared from the dried bark and is used in medicine as an aperient and tonic.

**Cascarilla Bark** is obtained from the twigs and branches of a small tree of the Euphorbiaceæ, found in the Bahama Islands. The bark has a pleasant, aromatic odor, and an aromatic but disagreeably bitter taste; when burned, it gives an agreeable scent, and is therefore used in incense.

**Cascina**, comm., prov. Pisa, Tuscany, Italy, on river Arno; was a scene of the defeat of the Florentines by the men of Pisa, 1364; p. 25,895.

**Casco Bay**, a bay on the coast of Cumberland co., Me., extends from Cape Elizabeth to Bald Head. The islands of the bay, said to number 365, are nearly all utilized as summer resorts.

**Case**, the grammatical term for the various inflectional forms of the substantive parts of speech.

**Case**. See **Trial**, **Printing**.

**Casation** is an advanced stage of degeneration in animal tissues, in which they become of a cheesy consistency. It is particularly associated with tubercular conditions. See **TUBERCULOSIS**.

**Case-hardening**, the operation by which wrought iron is hardened by converting the surface into steel. Tools, keys, parts of machinery, etc., to be hardened are packed into an iron box with charcoal and heated to dull redness for varying periods, according to the size of the article and the thickness of coating required. The carbon enters into combination with the iron, and produces a superficial layer of steel, by much the same action as that by which steel is obtained in the cementation process.

**Caseine**, a proteid which is formed in milk, and is the principal constituent of cheese. Under the influence of rennet or acids it separates, and produces curd or caseine. See **CHEESE**.

**Casemate**, in modern military engineering, a bomb or shell proof chamber, usually erected upon or under the parapet of a fortification, and used as a shelter for guns, barracks, magazines, and hospitals.

**Casement, Roger David** (1864-1916), Irish rebel, left Germany, in 1916, for Ireland, in a German submarine carrying arms to Ireland; was caught and hanged.

**Caserta.** (1.) Province of Italy, called Terra di Lavoro down to 1871, and forming part of Campania; p.810,000. (2.) Town and episc. see of Italy, cap. of above prov., has grown up around the royal castle, built here in 1752 by Charles III. of Naples; p. 32,709.

**Case School of Applied Science.** A scientific school in Cleveland, Ohio, founded in the year 1881 on an endowment bestowed by Leonard Case. It is organized in departments of mathematics and astronomy, English, economics, modern languages, geology and mineralogy, drawing and applied mechanics. The last forms the foundation of the special work done in the department of civil, mechanical, electrical, and mining engineering, physics and chemistry, and is required of all students.

**Case-shot, or Canister,** form of projectile used in gunnery. It consists of a quantity of small shot, etc., enclosed in a metal case or canister, which bursts on being discharged.

**Case System.** A method of teaching law introduced into Harvard University in 1869 by Professor C. C. Langdell, by which the student is referred directly to the cases which form the law upon the subject of study. This method is now in uses in other law schools throughout the United States and has received favorable comment abroad.

**Casey, Thomas Lincoln** (1831-96), American soldier and civil engineer, was born at Sackett's Harbor, N. Y. He made a notable record as an engineer officer during the Civil War, and in 1877 was given charge of the public buildings and grounds in the District of Columbia. In 1888 he was appointed brigadier-general and chief of engineers in the U. S. army, and the following year was given charge of the construction of the new building for the Library of Congress, which was practically finished at the time of his death.

**Cash,** that which was usually contained in the strong box—money. In modern commercial language, cash includes not only specie or coin, but bank notes and even checks.

**Cashel,** a city in County Tipperary, Ireland. Ruins of the cathedral, founded in the 12th century, with remains of an abbey, palace, and round tower, form a conspicuous group on the summit of a bold limestone

mass. The famous 'Synod of Cashel' was held here in 1172; p. 2,938.

**Cashew Nut.** The fruit of a tree (*Anacardium occidentale*), native to tropical America, that, in the United States, can be cultivated only in southernmost Florida, since it is very sensitive to cold. The peduncle of the fruit becomes greatly enlarged, fleshy, and pear-shaped. It is red or yellow in color, is known as 'cashew apple,' and forms an important article of food, being pleasantly acid; it is also the source of a liquor. At its tip is the kidney-shaped nut, whose kernel is protected by a double shell, and is edible when roasted. A milky juice, which is very acrid, and turns black when exposed to the air, is obtained from the tree, and is useful for varnishing, especially as a protection against ants.

**Cashgar.** See **Kashgar.**

**Cashibos,** a tribe of South American Indians on the Ucayali River, who eat the infirm and aged of their own people, and generally live in scattered groups in the woodlands.

**Cashmere.** See **Kashmir.**

**Cashmere or Shawl Goat,** a breed of the domesticated goat remarkable for the thick undercoat of wool which occurs beneath the long hair. It is a rather small variety, with pendent ears and long, flattened horns. It is most abundant in Tibet, but is also bred by the Kirghiz in Central Asia. The undercoat is combed out in summer, and is used in the manufacture both of shawls and of a very fine and soft cloth.

**Cash Register.** See **Calculating Machines.**

**Casimir-Périer, Jean Paul Pierre** (1847-1907), French Statesman; elected a deputy in 1874, he was successively under-secretary of war, vice-president of the Chamber, President of the Chamber, and finally, in 1894, was elected President of the Republic.

**Casino,** an establishment very popular in country places or summer resorts; usually contains conversation, dancing, music, reading, billiard, and other rooms.

**Cask.** See **Cooperage.**

**Caskets, or Casquets,** dangerous group of islands in English Channel, 8 m. w. of Alderney.

**Caslon, William** (1692-1766), the first great typesetter that England produced, was born at Cradley, Worcestershire. The earliest dated specimen of his printing types in book form is called *A Specimen of Print-*

*ing Types*, by William Caslon and Son (1763).

**Casoria**, tn., prov. Naples, Italy, 6 m. n.e. of Naples; p. (1901) 12,725.

**Caspary, Carl Paul** (1814-92), German scholar and theologian, born at Dassau, and appointed, in 1857, professor of theology at Christiania—a chair he held till his death. Besides theological and philological studies, he wrote an Arabic grammar (4th ed. 1887).

**Caspian Sea**, the largest inland sheet of water on the earth, lies on the border-line between the w. of Asia and the e. of Europe (Russia), with Persia at its s. extremity. Its longest axis stretches from n. to s., a distance of 760 m., while its width varies from 115 to 280 m., and its area covers 170,000 sq. m. In spite of the fact that it receives the largest river in Europe, the Volga, as well as the Ural, Atrek, Kizil-Uzen, Kuma, and Terek, the Caspian is slowly shrinking, chiefly in consequence of the vast evaporation. Enormous quantities of sturgeon and shad are taken every year, especially in and near the estuary of the Volga. The principal seaports on the w. shore are Astrakhan, Petrovsk, Derbent, Baku, Lenkoran; on the s. or Persian shore, Resht, Enzeli, and Astrabad; and on the Asiatic or e. coast, Krasnovodsk and Mikhailovsk.

**Cass, George Washington** (1810-88), American engineer and railway official, was born at Dresden, O. He erected over Dunlop's Creek, Pa., the first cast-iron bridge in the states. He later became president of several railroads.

**Cass, Lewis** (1782-1866), American statesman, born at Exeter, N. H., on Oct. 9, 1782. In the War of 1812 he served in the West, and became a brigadier-general in the regular army in March, 1813. From 1813 to 1831 he was governor of the territory of Michigan, and in this capacity showed great administrative ability; conciliated the Indians, with whom he made a number of important treaties; built roads and made other public improvements, and encouraged exploration. Altogether his name is one of the greatest in the history of the Northwest. From 1831 to 1836 he was Secretary of War in Pres. Jackson's cabinet, and from 1836 to 1842 was the U. S. Minister to France. He was Secretary of State in the cabinet of Pres. Buchanan, but resigned because of his disapproval of the President's vacillating policy toward the South.

**Cassaba**. See **Kassaba**.

**Cassagnac, Adolphe Bernard Granier**

**de** (1806-80), French journalist and politician; vigorously opposed liberal ideas and liberal reforms. After the fall of Napoleon III. he became a prominent member of the Bonapartist party. Cassagnac left several historical works: *Histoire des Classes Nobles et des Classes Anoblies* (1840), *Souvenirs du Second Empire* (1879-82).

**Cassagnac, Paul Adolphe Marie Prosper de Granier de** (1843-1904), French journalist and politician, son of Adolphe Cassagnac. An important member of the Bonapartist party, he took a prominent part in every agitation for the overthrow of the Republic. In 1886 he founded the paper *L'Autorité*. Having deserted the Bonapartists, he was one of the committee of six who arranged with General Boulanger his *coup d'état* (1889). He is the author of *Empire et Royauté* (1873), *Mémoires de Chislehurst* (1873).

**Cassander** (d. 297 B.C.), son of Antipater, the general, and one of the successors of Alexander of Macedon. Cassander seized Athens (318), and established himself in 301 B.C. as king of Macedonia. In 315 B.C. he rebuilt Thebes, destroyed by Alexander 20 years before.

**Cassandra**, in Greek legend, one of the daughters of Priam, king of Troy, and Hecuba.

**Cassandra**, the most westerly of the divisions of the Chalcidice peninsula, jutting into the Ægean Sea between the Gulfs of Salonica and Cassandra.

**Cassatt, Mary** (1845-1926), American artist, was born in Pittsburgh; is represented in the Metropolitan Museum, New York; the Corcoran Art Gallery, Washington; and the Luxembourg. She was a member of the Legion of Honor. Among her best known paintings are *The Bath*, *Breakfast in Bed*, *Children Playing with a Cat*, *Mother's Caress*, *Maternity*.

**Cassation, Court of**, the supreme judicial authority in France, whose function it is to see that, in the administration of justice by the different tribunals, the law has been properly applied. It does not enter into the merits or process of the litigation, but confines itself to the purely legal aspect of the case. The Court of Cassation was constituted by the National Assembly in 1790. Its members are chosen from among the presidents of the court of appeal, high functionaries at the ministry of justice, law professors, and eminent members of the bar at the Court of Cassation. They are elected for life or till

they reach the age of seventy-five, and are appointed by the President of the Republic upon the recommendation of the Home Secretary. The court is divided into three divisions—Court of Requests, Civil Court (both for civil suits), and Criminal Court; and to each court 15 judges are attached, with a president in addition. Besides, there is the first president of the entire court.

**Cassava**, known also as Manioc or Mandioc (Brazil) and as Juca or Yuca (elsewhere in South America), a tropical shrub about 6 ft. in height, with palmately divided leaves and a large tuberous root (8 to 10 in.) containing an acrid, milky juice. The roots of the cassava form a staple article of food in Africa and South America, having something of the taste and quality of parsnips. But it is in the manufacture of starch that the cassava is of the greatest importance, that product being prepared by pulping the root, washing out the starch, and drying it. Tapioca is made from cassava starch by heating it gently on iron plates until it forms granules. In Florida the cassava is used chiefly as a feed for stock.

**Cassel**. See **Kassel**.

**Cassell, John** (1817-65), English publisher, founder of the London firm of Cassell & Co., was born in Manchester.

**Cassena**. See **Yapon**.

**Cassia**, a botanical genus including several hundred species of herbs and trees belonging to the order Leguminosæ, natives of Africa and the warmer parts of America and Asia. From the bark an oil is distilled which resembles oil of cinnamon.

**Cassianus, Jonnes Eremita**, or **Joannes Massiliensis** (?360-448), a Scythian monk and theologian; was ordained by Chrysostom at Constantinople in 403, and afterward instituted monastic life in Provence, France. He was canonized after his death. He left *Collations*, or conferences of the fathers of the desert, and seven books on the Incarnation.

**Cassin, John** (1813-69), American ornithologist, was born near Chester, Pa.; prepared many reports for the U. S. Government, including *Ornithology of the United States Exploring Expedition* (1845), *Ornithology of Gillies' Astronomical Expedition to Chili* (1855), *Ornithology of the Japan Expedition* (1856).

**Cassini, Count Arthur Pavlovich** (1835) Russian diplomat. He entered the public service in 1854, and thereafter was regularly promoted in the diplomatic service, holding

positions in all the European capitals until he was appointed Russian minister at Peking in 1891. At that court he became conspicuous as the instigator and developer of Russia's Manchurian policy, and drafted the Manchurian convention. In 1897 he was made minister and shortly afterward ambassador to the United States.

**Cassini**, a family of distinguished astronomers. **GIOVANNI DOMENICO CASSINI** (1625-1712), was born in Perinaldo near Nice. His discoveries relating to the planets Mars and Venus and his settlement of the theory of Jupiter's satellites so enhanced his reputation in France he was made astronomer-royal and first director of the Paris observatory (1671-1711). His works include *Opere Astronomica* (1666), and *Origines et progrès de l'astronomie* (1693).—His son, **JACQUES** (1677-1756), born in Paris, succeeded to his father's appointments. **CÉSAR FRANÇOIS**, or **CASSINI DE THURY** (1714-84), son of Jacques and grandson of Giovanni, devoted himself chiefly to geology. He is best known by his topographical map of France, finished in 1793 by his son, **JACQUES DOMINIQUE**, Comte de Thury (1748-1845), who, on his retirement in 1793, terminated his family's connection with the observatory of Paris.

**Cassino**, town, Italy, in the province of Caserta, nearly midway between Rome and Naples. It occupies the site of the ancient Casinum, colonized by the Romans in 312 B.C., and has remains of a Roman amphitheatre and other ancient buildings. Back of the city on a hill 1,700 ft. high was the famous monastery of Monte Cassino, founded by St. Benedict in 529. Used as a fortress by the Germans in World War II, it was bombed by the Allies, March 15, 1944; p. 21,275.

**Cassino**, a card game, is usually played by two or four, although an odd number may play, the number being limited by the capacity of the deck of 12 cards. The dealer distributes four cards to each player, one or two at a time, the card or cards before his own being laid face up on the table. The object of the game is to take as many cards from the board as possible and is attained by pairing, combining, building, and calling. Each player beginning on the left of the dealer must play to a board, or take, or make a combination or build. When the hands of four have been exhausted cards are again distributed, and so on until the pack is exhausted. The winner of the last card in the last deal takes all the cards left on the board. The game is 21 points and the value of points

is as follows: big cassino (10 of diamonds), 2 points; little cassino (2 of spades), 1 point; each ace, 1 point; the majority of the cards of the suit of spades, 1 point; the majority of all the cards, 3 points; sweeps (clearing the board of cards), 1 point. Occasionally, in building, the jack is reckoned as 11, the queen as 12, king 13, and ace, 1 or 14.

**Cassiodorus, Flavius Magnus Aurelius** (c. 480-c. 570), Latin statesman and man of learning, was chief minister successively to Théodoric, Amalasontha, Athalaric, Theodatus, and Vitiges. After the victories of Belisarius (about 540 A.D.) he retired to the monastery of Viviers in Bruttium, which he had founded..

**Cassiopeia**, an antique northern constellation adjacent to Cepheus, traversed by the Milky Way.

**Cassiopeia**, in Greek legend, the mother of Andromeda.

**Cassiques**, Central American passerine birds. They belong to the family Icteridæ, which includes the American orioles and blackbirds.

**Cassiquiare**. See **Orinoco**.

**Cassiterides**, a group of islands from which the Phœnicians procured tin.

**Cassiterite**, **Tinstone**, or **Black Tin**, impure tin dioxide,  $\text{SnO}_2$ , the principal source of tin. It is black, or sometimes deep brown, in color, and is often crystallized in tetragonal crystals, which have a brilliant lustre and great hardness. Its high sp. gr. (?) greatly facilitates the washing and sorting of tin ores. 'Stream tin' is cassiterite in rounded, waterworn grains or pebbles, found among the sand and gravel of streams. 'Wood tin' has a fibrous structure. Tinstone is associated usually with granite masses, and with the veins which these send out into the rocks around them.

**Cassius**, distinguished Roman clan. (1.) **SPURIUS CASSIUS VISCELLINUS**, consul in 502, 493, and 486 B.C.; founded the greatness of Rome by making (493) the league with the Latin cities, and (486) that with the Hernicans. He was accused of aiming at monarchy, and put to death by the patricians; according to some accounts, indeed, by his own father. (2.) **CARIUS CASSIUS LONGINUS**, the murderer of Julius Cæsar. After Cæsar's death he went (43 B.C.) to Syria, defeated Dolabella, and, after ravaging Syria and Asia, together with Brutus met Augustus and Antony at the Battle of Philippi (42 B.C.). In the first engagement his troops were defeated, while Brutus was successful; and he

compelled his freedman to slay him. (3.) **CASSIUS PARMENSIS**, so called from Parma, his birthplace, was also one of the murderers of Cæsar. After the battle of Philippi he joined Sextus Pompeius, then went over to Antony, and when the latter had been defeated at Actium, was put to death by Augustus (30 B.C.).

**Cassivelaunus**, a British prince who ruled the country n. of the Thames, and led the national resistance to Cæsar's second invasion in 54 B.C.

**Cassock**, originally a long military horseman's cloak, but latterly restricted to a garment worn by clergymen or other ecclesiastical functionaries.

**Cassowary**, one of the five living kinds of running birds, confined to Australia, New Guinea, and the adjacent islands.

**Castaldi, Pamfilo** (1398-1490), Italian humanist and poet, born at Feltré in Lombardy. Italian writers claim that Castaldi is the real inventor of movable types, and therefore of printing; and that the secret was carried to Gutenberg by Johann Fust, who is alleged to have been one of Castaldi's pupils and intimates.

**Castalia**, a spring on Mount Parnassus, near Delphi, held to be frequented by Apollo and the Muses.

**Castanet**, a simple clapper instrument, consisting of two small concave pieces of hard wood or ivory. The pieces are fastened together by a cord, which is slipped over the thumb of the performer, who strikes the two halves together with his fingers. Usually the player has a pair of castanets in each hand. The instrument is of Spanish origin, and it is still largely used by the Spaniards and Moors as an accompaniment to their dances and guitars.

**Castañón, Don Francisco Xaver, Duke of Bailén** (1756-1852), Spanish commander, born in Vizcaya. During the Peninsular war he co-operated with Wellington, and rendered complete the successes of Albuera, Salamanca, and Vitoria.

**Caste**. In India, class distinction, or caste—much more pronounced and rigid than among western peoples—is entirely an accident of birth. In whatever caste a man is born, in that caste he continues. One of the most important 'caste prejudices' has reference to food. Members of different castes may neither eat nor drink together, and no one may partake of a dish prepared by one of lower caste than himself. To a Hindu loss of caste means not merely social ostracism

cism, but excommunication from religious rights, and exclusion from sanctuaries. In a climate in which the tendency is in the direction of voluptuous languor, caste has taught repression and self-control. High barriers against indiscriminate intermarriage have preserved purity of blood and intellectual ability; encouragement of hereditary trade and pursuits has led to the creation of experts. Caste is not dead. It still appeals to the people, and, whether for good or evil, it is a potent factor in British dealings with the Hindu subjects of the Indian empire.

**Castelar, Emilio** (1832-99), Spanish statesman, orator, and author, born at Cadiz. Devoting himself to politics while still young, he soon acquired great influence by his eloquence and was frequently persecuted by the government for liberal sympathies. Condemned to death after the attempted insurrection in 1866, he escaped to Paris, but returned to Spain in 1868. He largely assisted in the downfall of King Amadeus (1873), and in September of that year was appointed dictator by the Cortes, but resigned (1874). Among his works are: *Historia del Movimiento Republicano en Europa*, and many minor works.

**Castelbuono**, tn., prov. Palermo, Sicily; p. (1901) 10,761.

**Castelfranco**. (1.) Town and episc. see of Italy, prov. Treviso, the birthplace (1476) of Giorgione; in its cathedral is a Madonna by the great painter. Here the French defeated the Austrians in 1805; p. 15,823. (2.) Town, Italy, engaged in silk trade; p. 15,000.

**Castel Gandolfo**, tn., prov. Rome, Italy, on the left shore of Lake Albano. Has a papal summer palace, built by Urban VIII. in the 17th century; p. 3,000.

**Castellammare**. (1.) Town, Sicily; exports wine, olive oil, anchovies and corn; p. 16,960. (2.) C. DI STABIA, tn. and episc. see, Italy, on Gulf of Naples, was founded on the ruins of the ancient Stabiae, which perished at the same time (79 A.D.) as Pompeii. There is a former royal villa (Quisisana), now a hotel, an arsenal, and ruins of a castle built by the Emperor Frederick II.; p. 43,000.

**Castellanos, Juan de** (c. 1510-90), Spanish poet, born at Seville; best known as the author of *Elegias de Varones Ilustres de Indias* (1589).

**Castellon**. (1.) Province, Valencia, Spain; area, 2,495 sq. m.; on the Mediterranean coast. It has fisheries and produces fruit. Silver, lead and cinnabar are mined; p. 316,249. (2.) C. DE LA PLANA, cap. of

above prov. Fortress, 4 m. from Mediterranean; exports oranges, wine, etc.; p. 36,075.

**Casti, Giambattista** (1721-1803), Italian poet, born at Prato. His chief works are *Poema Tartaro* (1803), a satire on the Russian court; *Gli Animali Parlanti* (1802); *The Three Goats*, published 1841.

**Castiglione, Baldassare, Count** (1478-1529), Italian writer, born at Casanatico; entered the service, successively, of several Italian rulers, including Duke Lodovico Sforza (il Moro) and Pope Clement VII., for whom he went to Spain in 1525 as papal nuncio. From his experiences in court life, he wrote *The Cortegiana* (1528; best modern ed. is that of Cian. 1894) in the form of conversations held between ladies and gentle in the palace of Urbino.

**Castiglione, Carlo Ottavio, Count** (1784-1849), Italian philologist, born in Milan; established his reputation by the *Me moire Géographique et Numismatique sur la Partie Orientale de la Barbarie* (1826), wherein he attempts to reveal the history of those towns in Barbary whose names are preserved on Arabic coins.

**Castile, or Castille**, a former kingdom of Spain, divided into Old Castile and New Castile, and occupying the central plateau of the peninsula. Old Castile, with an area of 25,372 sq. m., was in 1833 divided into the provinces of Valladolid, Valencia, Burgos, Santander, Logroño, Segovia, Soria, and Avila; New Castile (area, 27,935 sq. m.) into Toledo, Madrid, Guadalajara, Cuenca, Ciudad Real. Castile formed in the 8th century part of Leon, but in 923 became practically independent.

After the country had passed through many vicissitudes, Isabella became queen in 1465, and by her marriage with Ferdinand, King of Aragon (1469), the crowns of Castile and Aragon were united, and the history of Castile merges in that of Spain.

The Castilians are distinguished by their haughty gravity of demeanor, their inclination to bigotry, and their lack of education. Their dialect is the official language of Spain.

**Casting** is (1.) a process, and (2) its product. Casting is the *process* of pouring melted metal or other fusible substance into moulds, where it cools and hardens into the shape of the mould. A large part of the iron, brass and type-making industries depends on casting. Glass, wax, and similar fusible substances are often cast. Slag and analogous melted minerals are sometimes cast to form bricks and the like.

The details of the casting process vary with the melting temperature of the substance, its physical and chemical affinities for other substances when melted, and the nature of available mould materials. The kind of mould that can be used is an essential factor. In the case of iron and brass, the preparation of the moulds is the most important part of the art of founding, to which casting belongs (see IRON FOUNDRY). Sand containing a small percentage of clay or loam is used for most moulds for iron and brass, being made slightly damp so as to hold the impress of the pattern and resist the pressure of the molten metal. Some sand moulds are baked, and those parts of moulds which serve to 'core' out interior hollows in the shape desired are nearly always baked (cores). Loam moulds are used for certain purposes, being baked before casting. In a few cases iron is cast in iron or part-iron moulds, usually to obtain a hard chilled surface. Casting without moulds is practised only in rare instances, as in making shot by allowing melted lead to go through a screen, from which the drops can fall far enough to harden. 'Squirting' the dissolved cellulose for incandescent-lamp filaments is an analogous process.

Sometimes casting serves to join two pieces. Wrought-iron or steel rods are sometimes embedded in a casting by setting them in the mould to project part way into the hollow of the mould. Casting iron is the most difficult of casting processes, and its troubles are typical of those inherent in casting. The high temperature of the melted iron restricts the choice of mould substances. In melting the metal, contamination by the fuel and gases takes place, and the ready oxidation of iron by air causes a certain loss of iron. The iron that is tapped from the furnace not only contains some entrained and dissolved gases, which must separate out in either ladle or mould if the casting is to be sound, but also by its heat generates steam and gases from the material of the mould. These must be allowed to pass out of the mould freely, or they will burst the mould, or at best make the resulting piece porous and useless. When the actual casting has been successfully accomplished, the hot piece must cool slowly and uniformly; if one part solidifies long before the rest of the piece, the uneven distribution of contraction during cooling will warp the piece out of shape or will give rise to dangerous stresses in the finished piece. Annealing, *i.e.*, reheating the cooled piece to red heat and allowing it to cool very slowly

the oven, is a means of removing such stresses, but on account of its additional cost is seldom employed.

Casting denotes also the *product* of the process, or the piece cast. Ordinarily, it means a piece of iron (cast iron) the shape of which was produced by moulding and pouring. As nearly every machine is in the main an aggregation of castings, the qualities of iron castings are influential in determining machine design. Castings are rather rough of surface; have a hard skin, due to contact and partial fusion with the sand of the mould; are not precisely true to form; are rather brittle, and not flexible, or ductile; are weak against tensile stresses; are apt to be non-homogeneous, and may have unknown shrinkage strains in their interior. Gas bubbles or porous spots frequently occur in them. Where castings must fit given dimensions exactly, they have to be dressed (by turning, planing, chipping, filing, etc.). For fastening together different castings by smaller joining-pieces (bolts, pins, etc.), steel must be used to obtain the necessary strength. As a consequence, also, of the brittleness of castings, riveting is never employed to join them.

Steel castings have come into considerable use, of recent years, for those purposes wherein great strength and absence of brittleness are demanded. The steel is melted in an open-hearth gas furnace, such as is used for making steel, and is poured into sand molds in the same way as cast iron. Steel castings are usually annealed, to make them soft and ductile, and get rid of shrinkage strains.

**Cast Iron.** See **Iron**.

**Castle**, a term denoting a stronghold. Among Irish antiquaries, *caiseal* (pron. *cashel*) is restricted to a certain kind of walled enclosure of considerable extent, having rooms within its walls, which are of great breadth. In Great Britain, again, the word has been applied to forts surrounded by ramparts of earth, or stone, or vitrified stone; to brochs, and to large feudal castles.

In Palestine, the ruins of no less than four different kinds of castles have been found in one place—at Ta'anuk of T'ana, near Jaffa. Of these, the oldest, supposed to be Canaanite, is of unhewn stone, two are Israelite of different periods, and the latest is Arabian. The Arabian castles are of great interest from the fact that Arab influence is very perceptible in European mediæval castles. This resemblance is due not to Arab conquest in S Europe, but to the long residence of Europeans in Syria during the crusades. The cru-



saders' castles in Syria were themselves of the highest interest. Of Reginald of Châtillon's castle of Kerak near the s.e. coast of the Dead Sea, it is stated that the massive walls rose to a height of 100 ft. and were in one place 27 ft. thick. Like its Eastern congeners, it displayed the features of concentric defence—an idea not properly understood by European architects prior to the crusades. This style of fortress attained its full development in England, under the direction of Edward I.;

Later an opera house, an immigrant station (1858-1890), and an aquarium. It was razed in 1941 to make way for the approaches to the Brooklyn-Battery Tunnel.

**Castlemaine, Barbara Villiers, Countess of Castlemaine** (1641-1709), mistress of Charles II. after the Restoration; she was instrumental in securing the dismissal of Clarendon. She is known as a 'beautiful termagant,' avaricious, recklessly extravagant.

**Castlereagh, Robert Stewart, Vis-**

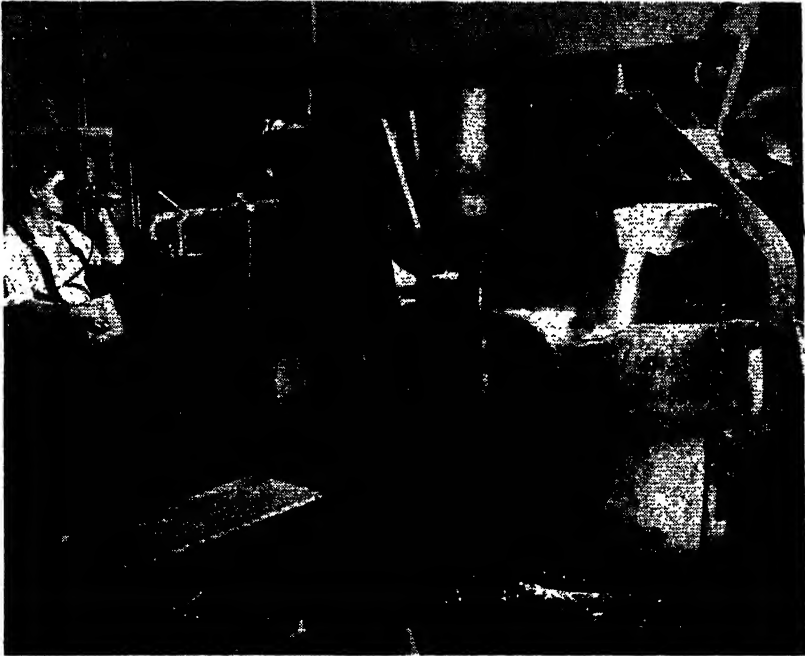


Photo by Ewing Galloway, N.Y.

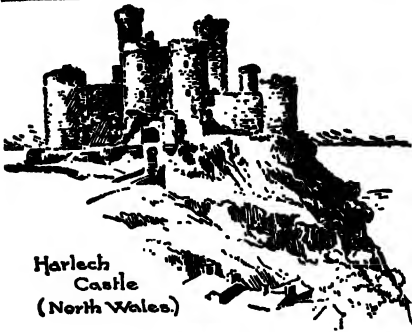
Making castings for paper-making machinery, manufactured by Rice Barton Corp., Worcester, Mass.

and the ruins of the castles of Conway, Carnarvon, Beaumaris, and Harlech, all in Wales, still testify to his skill.

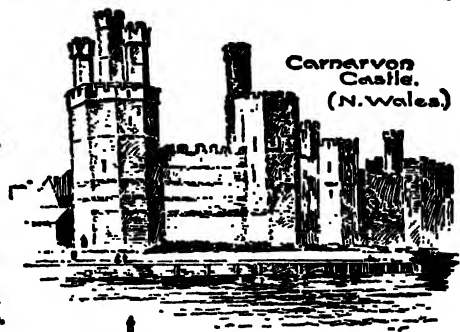
After the 13th century a greater degree of luxury began to prevail in these castles, and in later centuries they imperceptibly ceased to be strongholds, their defensive features being refined away. See M'Gibbon and Ross's *Castellated and Domestic Architecture of Scotland* (1887-92); Viollet le Duc's *Dictionnaire de l'Architecture Française* (1858-86).

**Castle Garden**, a round building in Battery Park, New York city, at the s. end of Manhattan I., originally called Fort Clinton.

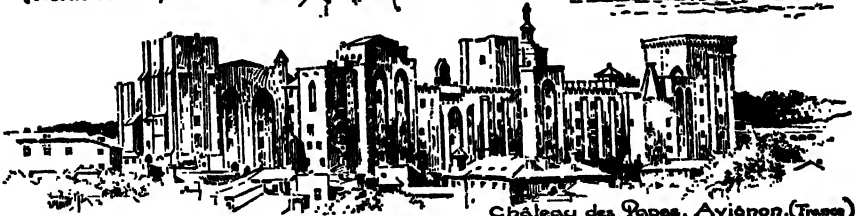
**count** (1769-1862), Eng. statesman, appointed keeper of the Privy Seal; then president of the Board of Control (1802) in Addington's ministry; in January, 1805, he became war minister under Pitt, and afterwards held the same office in the Portland cabinet until September, 1809. As Foreign Secretary under Lord Liverpool, in 1812, Castlereagh became the moving spirit of the coalition against Napoleon, and the spirited campaigns of 1813-14 were practically due to him. He was England's representative at the Congress of Châtillon and Vienna (1814-15), Paris (1815), and Aix-la-Chapelle (1818). At this



Harlech  
Castle  
(North Wales.)



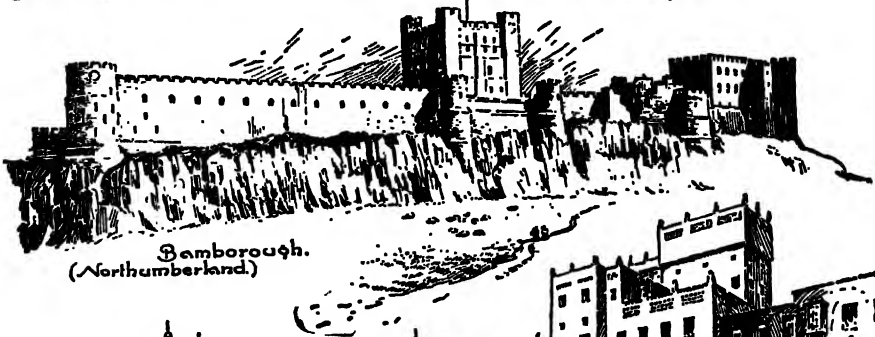
Carnarvon  
Castle.  
(N. Wales.)



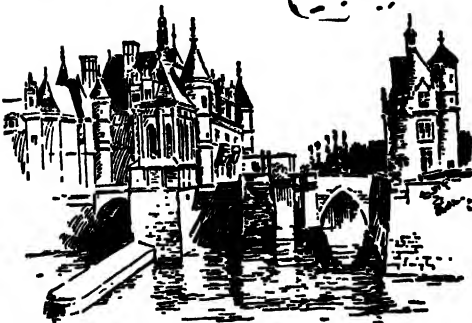
Chateau des Papes, Avignon, (France)



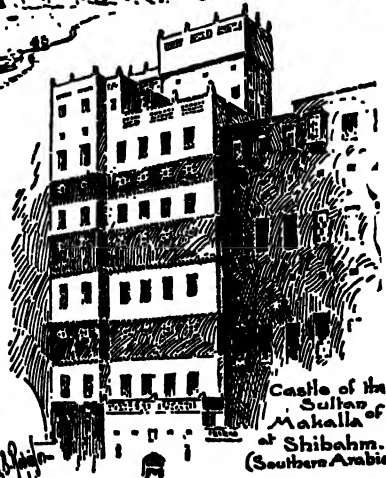
The Moated Castle of Leeds, (Kent)



Bamborough.  
(Northumberland.)



Chateau de  
Chenonceaux  
(France) with Drawbridge.



Castle of the  
Sultan  
Mahalla of  
Shibahm.  
(Southern Arabia)

Some Famous Castles.

period he incurred much odium at home in consequence of the drastic domestic measures of the government. He committed suicide at his seat, North Cray Place, in Kent. See Sir A. Alison's *Lives of Lord Castlereagh and Charles Stewart* (1861).

**Castor**, or **Castoreum**, consists of the dried preputial follicles of the beaver.

**Castor**=*a* Geminorum, a bright northern star. With a third-magnitude companion it makes a stately couple, in slow revolution; first measured by Bradley in 1719.

**Castor and Pollux**, the Dioscuri or 'sons of Zeus,' were, according to Homer, sons of

frequently planted for the sake of its broad, palmately lobed leaves, and richly colored stems.

**Castra Bonnensia**, Rhineland. See **Bonn**.

**Castration**, is the method by which animals, both male and female, are deprived of parts of their generative organs (testicles and ovaries.) This tends to improve their value for working, and also, castrated animals seem to grow and fatten much more quickly.

**Castrén, Matthias Alexander** (1813-52), Finnish philologist, born at Tervola. Among his works are *De Affixis Personalibus Linguarum Altaicarum* (1850), *Tillfälliga*



*Fancy Breeds of Cats.*

1, Siamese. 2, Russian. 3, Tabby. 4, Chinchilla. 5, Blue Persian.

Tyndarus and Leda, and brothers of Helen and Clytæmnestra. Castor was famous for his horsemanship, Pollux for his boxing; both died before the siege of Troy, but were permitted to enjoy immortality, though only on alternate days. See J. Rendel Harris's *The Dioscuri in the Christian Legends* (1903).

**Castor Oil**, an oil expressed from the seeds of *Ricinus communis*, consisting mainly of the glycerol ester of ricinoleic acid ( $C_{17}H_{34}O_6$ ), and procured chiefly from Calcutta. When taken internally, it acts as a simple purgative, stimulating peristalsis and the intestinal glands.

**Castor-oil Plant**. A euphorbiaceous plant (*Ricinus communis*), from the tropics, but

*Uppsäter* (1870), and others. See *Life by Snellman* in his *Samlade Arbeten* (10 vols. 1892-1901).

**Castriot, George**. See **Scanderbeg**.

**Castro, Cypriano** (1863-1924), president of the republic of Venezuela, was born in Los Andes. He was half white and half Indian (Andino), and was credited with great powers of oratory and debate. He fought his way into the capital, and assumed office as president on Oct. 24, 1899, then re-elected in February, 1902. In December of that year he embroiled his country with the allied Germans and British. In 1908, pending an ultimatum from The Hague, he went to Europe, whereupon Dr. Juan V. Gomez, the vice-

president, assumed control, and Castro was not allowed to land in South America on his return. (See VENEZUELA).

**Castro, João de** (1500-48), Portuguese captain and geographer, born at Lisbon. Going to the Indies (1545), he crushed the ruler of Cambodia, relieved the town of Diu, conquered Broach and Malacca, and sent his lieutenant, Antonio Moniz, to plant additional settlements in Ceylon. Castro was appointed viceroy (1547), but died the following year at Goa, nursed to the last by his beloved comrade, Francis Xavier.

**Castro y Bellvis, Guillen de** (1569-1631), Spanish poet and dramatist. His best known works are *Las Mocedades del Cid*, and its sequel, *Hasañas del Cid*.

**Castruccio-Castracani** (1281-1328), Italian general, born at Castruccio, near Lucca. His ideal was to found a great Ghibelline state in Tuscany, with Lucca as its capital. See Manucci's *Azioni di Castruccio-Castracani* (1843).

**Casuarina**, the name given to a genus of tropical trees and shrubs, chiefly Australian, with long, pendent, and leafless, though graceful, branches. They are valued for their hard wood.

**Casuistry**, the science which deals with difficult cases of conscience which undertakes to apply acknowledged principles of conduct to doubtful cases, or cases where there seems to be a conflict of duties.

**Casus Belli** (Lat. 'cause of war'). See INTERNATIONAL LAW.

**Cat**, generally the members of the mammalian family Felidæ. The cat genus (*Felis*) includes the most highly specialized of the carnivores. To this genus belong the large (lion, tiger, leopard, jaguar, etc.) and small (lynxes, wild cat, etc.) cats, often differing from one another chiefly in external characters. The domestic cat is believed to have been derived from the Egyptian *F. caffa*, and not from the fierce wild cat (*F. catus*) of Europe, a larger and more powerful animal. In spite of prolonged domestication, the cat is less variable than the dog, and more prone to revert to a wild or semi-wild state. The chief variations are seen in color, in regard to which there are some interesting points—compare the fact that pure sandy cats are always males. The cat section (*Æluroidæ*) of the carnivores includes not only the true cats, or Felidæ, but also the civets (*Viverridæ*), the aardwolf (*Proteleidæ*), and the hyena (*Hyænidæ*). The Persian or long-haired domestic cat is the most popular and

most 'fancied' breed. This variety is bred in many shades of color. The most valuable of these is the pale self-silver or chinchilla, of a dull silver color all over, with as little marking or shading as possible, and with green eyes.

The markings form more important points in judging the common or short-haired cats. A very interesting variety is the Siamese, said to occur in pure blood only in the palace of the King of Siam and believed to be derived from a wild species of the East. It is of a pale-cream color, with feet, lower part of legs, muzzle, and ears all black. A fine all-blue cat comes from Russia and Iceland, and there are characteristic breeds from India, Abyssinia, and other parts of the world. One of the most striking varieties is the Manx cat, originating in the Isle of Man, the peculiarity of which is the disproportionate elevation of the hindquarters, and the extreme shortness of the tail.

Many societies devoted to the perfection of breeds of cats exist in Europe, and especially in England, and many shows are held annually. Recently a society of cat fanciers has been formed in the United States, and shows are annually held in New York City.

**Cataclysmal Action**, the term used by early geologists to account for any remarkable or sudden change in the rocks or geological structure of a country. The word has now been dropped from geological terminology.

**Catacombs**, the group of subterranean vaults and galleries in the neighborhood of Rome, memorable as the sepulchres of the early Christians. But the name is also held applicable to the Baths of Cleopatra at Alexandria and to the underground crypts of exactly the same description as their Roman congeners, at Naples, Syracuse, Chiuse, and elsewhere. The Roman catacombs consist of some forty or fifty groups of subterranean labyrinths cut out of the soft stone of the hills surrounding Rome. Some of them are comparatively near the surface of the earth; but beneath these, in the majority of cases, there are successive stories of greater depth, the lowest level being at a depth of seventy ft. The number of stories may be two, three, four, or even five; and their innumerable galleries run parallel to each other, or cross each other at right angles. Passages are so narrow that it is impossible for two people to walk along them abreast, economy of space being clearly an important matter with the early excavators. The rocky walls on both sides

of the passage have been hewn out into long tiers of niches. In some cases two bodies have been found in one niche. Each of the niches has been closed with a slab of marble or of terra-cotta, having the name of the deceased usually engraved upon it.

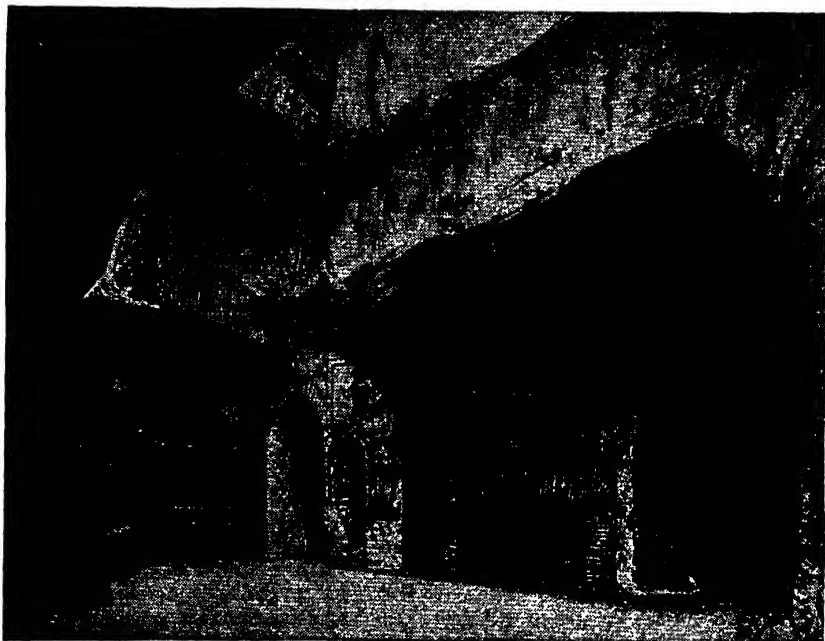
The most important of the catacombs are: St. Calixtus, with its *camera papale*, containing the tombs of martyred bishops of the 3d century, and in another part Byzantine mural paintings of the 8th century; Domitilla, with 1st-century frescoes, and more than nine hundred inscriptions; St. Priscilla, with its frescoed Madonna of the 2nd century; St. Agnes,

the 13th century; ranks in importance next to the Castilian; became a literary language between the 14th and the 16th century.

**Catalani, Angelica** (1779-1849), Italian singer, born at Sinigaglia, near Ancona. She made her début as a soprano at Venice (1797), and for some thirty years was almost unrivalled.

**Catalaunian Fields**, the celebrated battlefield where the confederated peoples of Gallia, under the leadership of Ætius, defeated Attila, King of the Huns, in 451.

**Catalectic Verses**, verses in which one of the normal number of syllables is omitted.



*Scenes in the Catacombs.*

perhaps the most archaic specimen; San Sebastiano; and St. Prætextatus.

The catacombs ceased to be used as a burial-place after the sack of Rome by Alaric in 410, and during the Middle Ages their very sites seem to have been forgotten.

**Catalan**, group of Romance languages largely spoken in the Spanish provinces of Gerona, Barcelona, Tarragona, Lérida, Valencia, Alicante, and Castellon de la Plana, as well as in the French department of Pyrénées Orientales and the Balearic Is. Catalan is an established language, with its own grammar and dictionary, and dating from

**Catalepsy** is a nervous disorder, characterized in a typical case by loss of movement, of consciousness, and of sensation. It occurs in cases of hysteria, hypnotism, atonic melancholia, and as the result of other psychoses. The subconscious condition may be short or long of duration—trances, lethargy and continuous sleep, are all cataleptic conditions. See Dana's *Textbook of Nervous Diseases* (1905).

**Cataloguing**. Any collection of books, if constantly added to, soon gets beyond the grasp of its collector, and to enable it to be used it becomes requisite that a catalogue be

prepared. The catalogue is at every step the guide-board to the reader. It must enable one to find a book of which either the author or the title is known, and it must show all the books the library has by a given author. It must also show what it has on a given subject or in a given kind of literature. There must, therefore, be an author catalogue, in which should be included titles of anonymous books, and other striking titles. There should also be a subject catalogue, which should include form entries, such as dictionaries, periodicals, poetry, fiction. When these two catalogues are combined into one, giving authors, titles and subjects in a single alphabet, the catalogue is called a dictionary catalogue. Printed catalogues so quickly become out of date by the addition of new books to the collections they cover that libraries have almost universally adopted the card system. In this the cataloguing is done on cards measuring 12.5 centimetres in length by 7.5 or 5 centimetres in height. These cards are alphabetically arranged in drawers in cases, and new entries are put in place as soon as ready thus keeping the catalogue constantly up to date.

In 1876, also, Mr. Melvil Dewey, late New York State Librarian, devised and published a scheme for the decimal classification of books in libraries. By this system the field of knowledge is divided into nine main classes numbered 1 to 9, general works falling into no one of these classes, being assigned to a 10th numbered 0. Each class is similarly subdivided into 10 divisions, each division into 10 sections, and so on decimally as far as may be needed. Subjects are arranged in simple numeric order, constituting a class list which brings books on the same subject together on the shelves, and in the card catalogue as well, with books on cognate subjects in the immediate vicinity. As a relative location scheme for shelf classification, it admits of indefinite expansion and has no superior but to make use of the card catalogue one must first consult an alphabetical index of subjects to find the class number to which the book may have been assigned. It is the most generally adopted of any scheme of classification.

**Catalonia**, an old principality and province in the extreme n.e. of Spain. The Pyrenees form its base, and the Mediterranean Sea and Aragon its e. and w. sides respectively. The district has since 1833 consisted of the provinces of Gerona, Barcelona, Lérida, and Tarragona, with a total area of 12,483

sq. m., and a p. of 2,500,000. Barcelona, the capital, is the second town in Spain; it has extensive manufactures of cotton, woolen, and silk goods, laces, leather, and paper. Catalonia was the Hispania Tarraconensis of the Roman conquerors. In the 5th century it was overrun by the Goths and Alani. It was under Mussulman rule in the 8th century. In 1137 it was joined to Aragon, and the two were in 1479 united to Castile; but the Catalans did not readily submit to loss of independence, and repeatedly revolted. After its conquest by Philip v., in 1714, it lost its separate constitution. The Catalan dialect, more akin to the Provençal of France than to the Castilian of Spain, is still spoken and written.

**Catalpa**. A genus of trees and shrubs (Bignoniaceæ), of which the best known is the Southern Indian bean-tree (*C. Catalpa*).

**Catalysis**. Certain chemical reactions occur at vastly increased rates in presence of a third substance (often small in quantity), which itself remains apparently unchanged. This substance is known as the catalytic agent. In the preparation of oxygen from chlorate of potash, the addition of manganese dioxide causes the oxygen to be liberated at a much lower temperature, and much more rapidly.

**Catamaran**, a raft used in the East, particularly by the natives of the Madras and Coromandel coasts. It consists of three pieces of wood lashed together, one of which serves as a keel, and the other two serve as sides. The rowers stand or kneel, and paddle with a bamboo.

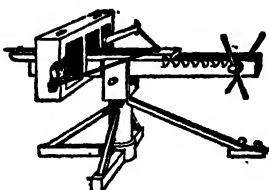
**Catamount**. See **Puma**.

**Catania**. (1.) Province of Italy, occupies the middle of the e. side of Sicily. Mount Etna fills its n.e. quarter, and s. of it is the fertile plain of Catania, drained by the Simeto; exports wheat and olives, as well as wine, fruit, sulphur, and silk and cotton manufactured goods. Area, 1,917 sq. m.; p. 705,412. (2.) Town and episc. see, cap. of above prov., at foot of Mt. Etna; one of the chief Sicilian seaports; p. 291,855. The Greek colony of Catana was founded in 730 B.C. by the Naxians. Hiero took it (476), and settled it anew, with the name of Ætna. The town was inundated by the tidal wave following the great earthquake of Dec. 28, 1908.

**Catanzaro**. Province of S. Italy; p. 567,758. Town and episc. see of Italy, cap. of above prov.; p. 59,737. Both province and town were devastated by the great earthquake and tidal wave of Dec. 28, 1908.

**Catapult**, an engine for hurling projectiles,

first used as an implement of war by the ancient Romans. The larger kind was mounted on a strong wooden platform, the trigger or projector was drawn back by ropes, and then held by a catch, while the missile was placed on it prior to letting it fly. The smaller implements were carried in the hand, and used for discharging javelins, darts, etc., at close quarters.



*Ancient Catapult.*

**Cataract** is any opacity of the crystalline lens of the eye, with consequent diminution of vision, varying from mere dimness to a total blindness to everything save the difference between light and darkness. Cataract may occur at any age, and from various causes. It may be congenital or juvenile, traumatic secondary to other eye-disease, or primary; and it may be senile. The immediate cause of cataract is in most cases not known. In congenital cases it tends to be associated with rickets and other disorders of nutrition. In some other cases, particularly in juvenile cataract, which is not congenital, it is the result of an injury, often a small punctured wound. It may also be secondary to degenerative changes which start in other parts of the eye and spread to the lens. It is believed that the structure of the lens renders it peculiarly liable to suffer from slight failure of nutrition.

**Catarrh**, an early stage in the inflammation of mucous membranes, consisting of increased discharge from their surfaces, which is accompanied by catarrh of the nasal mucous membrane.

**Catawba River**, a river of N. C. and S. C., which unites with the Congaree to form the Santee R. Below Rocky Mt., S. C., it is called the Wateree. Its length to Rocky Mt. is 250 m.

**Cat-bird**, a name applied to two distinct passerine birds—to the American *Galeoscoptes carolinensis*, a member of the thrush family (Turdidæ), and to the Australian *Elureduis viridis*, one of the birds of paradise (Paradisidæ).

**Catchfly**, a large genus (*Silene*) of the

pink family. Some species are viscid-pubescent, and occasionally entangle stray insects in their hairs.

**Catechism**, a treatise drawn up for instruction in the form of question and answer. The word has not in itself any exclusively theological reference, but popular custom confines the term to religious works of the required form. The first catechisms were no doubt drawn up for the guidance of catechumens or candidates for Christian baptism, and would be very short. The longer treatises of later date are connected with special movements for the spread of religious knowledge among the people.

**Catechu, Pale**, is an extract prepared from *Uncaria gambier*, a climbing shrub found in the Malay Archipelago; made from leaves and young shoots of the plant; tastes at first bitter and astringent, but afterward sweetish, and is used in medicine as a local astringent in the form of a lozenge, but its chief use is in the dyeing and tanning industries.

**Catechumen**, one who is taught by word of mouth. Candidates for baptism were so called by the early Church. They were divided into four classes: (1) *Inquirers*, who were instructed privately; (2) *Audientes*, or hearers, who, being sufficiently advanced, were admitted to the *Missa catechumenorum*, but left after the gospel and sermon (see MASS); (3) *Prostrati*, or *orantes*, or *genuflectentes*, who shared in the worship of the congregation; (4) the *Electi*, or *competentes*, who were ready and desirous to be baptized.

**Categorical**. A categorical judgment is contrasted as one which 'asserts an actual fact absolutely' with a hypothetical judgment, which 'asserts only the consequence that follows upon a supposition.'

**Categorical Imperative**, Kant's technical term to signify the unconditional law of duty as contrasted with a command which is valid only under the supposition of an already accepted end.

**Category**, a term in logic and philosophy. Its most important special uses are the Aristotelian and the Kantian. The Aristotelian doctrine of the categories is a classification of the kinds of predicates—of the different kinds of assertions that may be made about a subject. These categories are 10 in number, the first and fundamental being that of substance, the others adjectival predicates applicable to a thing or substance—quantity, quality, relation, place, time, situation, possession, action, and passion. Kant uses the term

category to signify the conceptions under which, according to his theory, we must think phenomena—phenomena as events in time must be brought under the category of cause and effect. (See KANT.) His table of categories consists of four groups of three each—the categories of quantity (unity, plurality, totality), the categories of quality (reality, negation, limitation), the categories of relation (substance, causality, reciprocity), the categories of modality (possibility, existence, necessity). Kant's categories refer only to phenomena—to sense experience, or, roughly speaking, to the objects of physical science. By later thinkers the term has been extended to cover any fundamental and necessary conception under which reality, whether physical or otherwise, must be thought; and thus Hegel's logic or system of categories is a metaphysic which is universal in its range. (See HEGEL.)

**Catena**, properly **Vincenzo di Biagio** (c. 1471-1531), Italian painter of the Venetian school; known for his *Count Raymond Fugger*, a patient rendering of pallid flesh (Berlin Museum), and *Knight kneeling before the Madonna* (National Gallery).

**Catenary**, in mathematics, is the curve assumed by a uniform flexible chain or rope when suspended from two points, and hanging freely under the influence of its own weight. Since by suitably varying the distri-



*Catenary.*  
cc, Common catenary.

bution of weight along a chain we may make it hang in the form of any assigned curve, which then becomes a special form of catenary, it is usual to distinguish the category in which the uniform chain hangs as the common catenary. As a curve it has many interesting properties, being one of the few curves for which the length of arc between two points can be expressed in terms of the positions of the points. Also, the area bounded by the arc, by the vertical lines through the extremities, and by the horizontal line which cuts across them, can be expressed by means of a simple formula. If the chain is loaded in such a way that the weight of any part is proportional to the horizontal projection of the part, the chain will hang in a parabola. This is the particular form of catenary

assumed by the supporting chains of a suspension bridge, in which the load is practically the roadway distributed uniformly in a horizontal direction, the weight of the supporting chain being negligible in comparison.

**Caterpillar**, the name given to the larvæ of lepidopterous insects. A caterpillar is a somewhat wormlike animal, with a distinct head, bearing strong mandibles, simple eyes, and short antennæ; a thorax, consisting of three segments, each furnished with a pair of jointed legs; an abdomen, consisting of 10 segments, though some of these may be indistinct, and bearing a variable number of unjointed 'false legs' or 'pro-legs.'

**Catesby, Mark** (?1679-1749), English naturalist and F.R.S., born and died in London. After travelling in N. America published *Natural History of Carolina, Florida, and the Bahama Islands, with Observations on the Soil, etc.* (1731-43), with colored figures drawn and etched by himself.

**Catesby, Robert** (1573-1605), English conspirator, born at Lapworth, Warwickshire. In 1604 he joined Thomas Winter and Guy Fawkes in the Gunpowder Plot (Nov. 4, 1605), and escaping to Holbeach, Staffordshire, was there shot.

**Cat-fish** (Siluridæ), a family of bony fishes in which the skin is either naked or furnished with bony plates; barbels are present about the mouth, and the air-bladder, when present, communicates with the ear by means of auditory vesicles. The skeleton shows many peculiarities: for example, the pectoral girdle is modified so as to give strength and mobility to the spine with which the pectoral fin is usually armed. The family is largely represented in America, especially in warm latitudes, where these fish live mainly in sluggish waters, and feed near the bottom. Some reach a large size, and are liked as food, but most of them are moderate or small in size, and regarded as uneatable or of little value.

**Catgut**, the material used for violin, guitar, and harp strings, for stringing rackets, and other similar purposes, is commercially obtained, not from the small intestines of the cat, but from those of the sheep, and also, for the rougher purposes, from those of the horse. The intestines are cleaned, then soaked in water until the external membrane can be scraped off; this, which the French call *filandres*, is used for rackets.

**Cathari**, dualistic heretics of the middle ages, who perpetuated the teachings of the Manichæans and Paulicians. They appeared



in most all of the European countries but originated in the Balkan Peninsula. The Cathari held that matter is intrinsically evil and the source of all evil; that men's bodies are evil and the product of the evil principle. They aimed by an ascetic life to free themselves from the power of the body; and the more advanced abjured all animal food as well as wine and marriage.

**Catharine.** See **Catherine.**

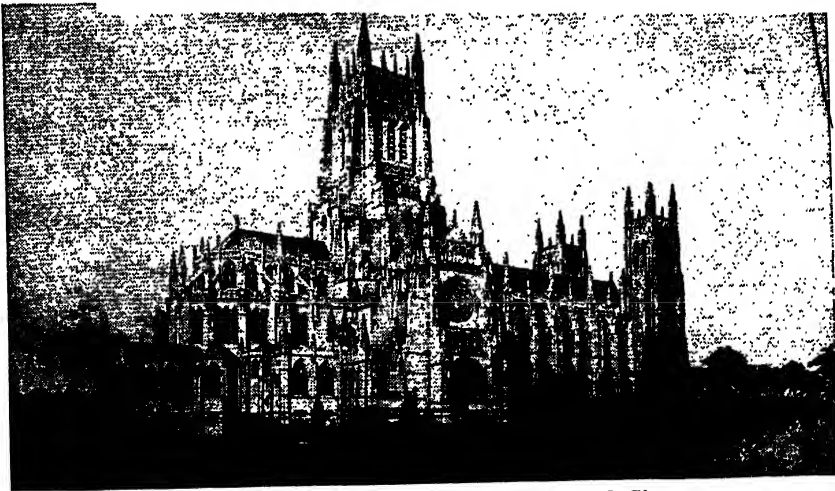
**Cathartics.** See **Purgatives.**

**Cathay,** the name given by Marco Polo to the Chinese Empire. See **CHINA.**

**Cathcart,** suburb of Glasgow, Scotland.

**Cathcart, Sir George** (1794-1854), British general, son of Sir William Cathcart

bishop, placed in the apse of his church, called in Greek his *kathedra* ('seat'); hence the church was designated as a cathedral church, and in the 10th century the noun cathedral appears, meaning the *seat* of a bishop. Cathedrals vary in rank with the dignity of the see to which they belong, and may be episcopal, archiepiscopal, metropolitan, or patriarchal. In the United States there are cathedrals in all the Roman Catholic and in most of Protestant Episcopal dioceses. The finest cathedrals in the country are St. John the Divine (P.E.) on Cathedral Heights, New York City; The Roman Catholic St. Patrick's Cathedral, New York City; and the Washington Cathedral, Washin



*Cathedral of St. John the Divine, New York City.*

(q.v.). He joined the army in 1810 and served under Wellington at Quatre Bras and Waterloo; was appointed governor and commander-in-chief of the Cape of Good Hope, where he brought to a close the Kaffir War. Appointed adjutant-general (1853), he served in the Crimea and was killed at Inkerman (November, 1854). He is the author of *Commentaries on the War in Russia and Germany in 1812-13* (1850).

**Cathcart, Sir William Schaw** (1755-1843), British general and diplomatist, first Earl Cathcart and Baron Greenock, was born in Petersham. He commanded the Copenhagen expedition (1807) and became ambassador to Russia (1813-20).

**Cathedral,** primarily the throne of a

D. C. The following are the chief cathedrals of European countries:

*Italy:* Bari, Bologna, Como, Ferrara, Florence, Lucca, Milan, Modena, Orvieto, Palermo, Piacenza, Pisa, Siena. For St. Peter's at Rome see the article **SAINT PETER'S.**

*Germany:* Bonn, Cologne, Freiburg, Mainz, Ratisbon, Speyer, Ulm, Worms.

*Austria-Hungary:* Vienna.

*France:* Amiens, Beauvais, Bourges, Chartres, Laon, Lyons, Notre Dame at Paris, Noyon, Orleans, Le Puy, Poitiers, Rheims, Rouen, Strassbourg, Tours, Troyes.

*Spain:* Barcelona, Burgos, Granada, Leon, Salamanca, Seville, Tarragona, Toledo.

*Belgium:* Antwerp, Brussels, Ghent, Louvain, Malines, Tournai.

The following list gives the Established Church cathedrals of *England and Wales*. See separate article on **ST. PAUL'S CATHEDRAL**, London.

Canterbury (Archbishop)	Manchester
York (Archbishop)	Monmouth
London (St. Paul's)	Newcastle
Durham	Norwich
Bangor	Oxford
Bath and Wells	Peterborough
Birmingham	Ripon Minster
Bradford	Rochester
Bristol	St. Albans
Carlisle	St. Asaph
Chelmsford	St. David's
Chester	St. Edmundsbury
Chichester	and Ipswich
Coventry	Salisbury
Ely	Sheffield
Exeter	Sodor and Man
Gloucester	Southwark
Hereford	Southwell Minster
Lichfield	Swansea and Brecon
Lincoln	Truro
Liverpool	Wakefield
Llandaff	Winchester
	Worcester

Consult F. H. Allen's *The Great Cathedrals of the World*; Wilson's *French Cathedrals*; Pratt's *Cathedral Churches of England* (1910); Gade's *Spanish Cathedrals* (1911).

**Cathelineau, Jacques** (1759-93), French insurgent general, was born in Pin-en-Mauges. An ardent royalist, he became leader of the Vendéans; took Nantes, but was mortally wounded by a musket ball, and his troops were dispersed.

**Cather, Willa Sibert** (1876-1947), American author, was born in Winchester, Va. Her publications include: *April Twilights* (1903); *The Song of the Lark* (1915); *My Antonia* (1918); *One of Ours* (Pulitzer prize novel, 1922); *The Professor's House* (1925); *My Mortal Enemy* (1926); *Death Comes for the Archbishop* (1927); *Shadows on the Rock*, (1931); *Lucy Gayheart* (1935); *Sapphira and the Slave Girl* (1940).

**Catherine, St.**, the name of several saints in the Roman Catholic Church. (1) **ST. CATHERINE**, virgin and martyr, commemorated Nov. 25; was martyred at Alexandria under the Emperor Maxentius in 307 or 312, being bound to a spiked wheel. Hence the *Catherine wheel*, with which she is commonly represented. (2) **ST. CATHERINE OF SWE-**

**DEN**, abbess of Wadstena (died 1381), commemorated on March 22. (3) **ST. CATHERINE OF BOLOGNA**, abbess of the convent of St. Clares, Bologna, who died in 1463, commemorated March 9. (4) **ST. CATHERINE OF GENOA**, noted for her devotion to the sick, especially during the plague of 1497-1501. She died in



Willa Cather.

1510 and is commemorated March 22. (5) **ST. CATHERINE DE RICCI OF FLORENCE** (1522-1590), entered the Dominican nunnery of St. Vincent at Prato, commemorated Feb. 13. (6) **ST. CATHERINE OF SIENNA** (1347-80), one of the most famous saints of Dominican Order; a mystic and ascetic who practised the most extreme self-mortifications, believed that she saw visions and had the gift of prophecy, and claimed to be the bride of Christ. She played a part in the politics of her day; was canonized by Pope Pius II. (1461); her day is April 30.

**Catherine I.** (c. 1680-1727), wife of Peter the Great, and empress of Russia after the death of Peter in 1725.

**Catherine II.** (1729-96), empress of Russia, daughter of a Prussian field marshal, was born in Stettin, and selected by the Empress Elizabeth in 1745 as the wife for the heir to the Russian throne. Her husband, on his accession to the throne in 1762, endeavored to divorce her, but Catherine was able to organize a conspiracy against him, which ended in his being dethroned and murdered in 1762. Becoming sole ruler, Catherine governed her empire with great energy, her reign being second only to that of Peter the Great in importance. She organized the administration of the country, attracted foreign colonists, especially Germans; and reorganized the army. In 1785 she regulated the privi-

leges of the nobility, and the bourgeoisie were given a special status in the organization of the municipalities. She founded a college for surgeons, as well as hospitals. She sought, but in vain, to introduce into Russia a complete system of education. In all her reforms she was animated by the spirit of the French philosophers of the 18th century, being in close touch through correspondence with Grimm, Voltaire, and others; while she attracted Diderot to St. Petersburg.

The prodigalities of Catherine's numerous favorites roused bitter discontent, and several pretenders appeared, claiming to be Peter III. Catherine waged war with Turkey (1772 and 1792) and with Sweden (1790), and after each of these, as well as through the successive partitions of Poland, added to the extent of her empire. Putting aside her loose private life and her numerous favorites she fully deserves the title of 'Great' which has been bestowed upon her. See *RUSSIA, History*. Consult W. Tooke's *The Life of Catherine II.*, Sergeant's *Courtships of Catherine the Great*; Gribble's *The Comedy of Catherine the Great* (1912); Anthony's *Catharine the Great* (1926).

**Catherine Archipelago.** See *Aleutian Islands*.

**Catherine de' Medici**, (1519-89), queen of France, was born in Florence. She was married to Henry, Duc d'Orléans, afterward Henry II. of France, but played no great part in French politics till 1559, when the first of her three sons, who all ruled over France, ascended the throne as Francis II. Opposed to her she found two parties, the Guises and the ultra-Catholics on the one hand, and the Protestants, on the other. She entered into an alliance with the Protestants against the Guises, until the Treaty of Amboise (1563) showed that they had become too strong. Her alliance with Spain and the Guise party resulted in the Massacre of St. Bartholomew (see *BARTHOLOMEW, MASSACRE OF ST.*). During the reign of her second son, Charles IX. (1560), and still more during the reign of her third son, HENRY III. (1574), she was virtual ruler of France. See *FRANCE, History*. Consult Sichel's *Catherine de' Medici*.

**Catherine of Aragon**, (1485-1536), first wife of Henry VIII. of England, the youngest child of Ferdinand and Isabella of Spain. Consult Hume's *Wives of Henry VIII.*

**Catherine of Braganza**, (1638-1705), queen-consort of Charles II. of England, daughter of John, duke of Braganza, and Louisa de Gusman.

**Catherine of France, or of Valois** (1401-38), daughter of Charles VI. of France. In 1420 she became the wife of Henry V. of England. Her second marriage (1423) with Owen Tudor gave rise to the Tudor line of English sovereigns.

**Catherine of Sienna, St.** See *Catherine, St.*

**Catheter**, a tube, formed of one of several different materials, and made in various sizes, for introduction, into the bladder for the purpose of removing urine, or into the Eustachian tube when obstruction is suspected there.

**Cathetometer**, an instrument of precision for the accurate measurement of small vertical displacements or differences of height.

**Cathode.** See *Anode; Electrolysis*.

**Cathode Rays.** See *Vacuum Tubes*.

**Catholic Action**, a postwar development within the Roman Catholic Church, may be defined as the cooperation of the laity and hierarchy for the application of Christian principles to public matters. How this is to be done and where the beginnings are to be made is variously decided in accordance with the problems presented by varying conditions in various lands.

**Catholic Church.** The term catholic literally signifies 'universal.' It was first employed from about 160 A.D. to mark the difference between the orthodox 'universal' Christian church and heretical bodies. The Church of Rome has always laid claim to the title, on the ground that it is the only pure channel of the faith. See *ROMAN CATHOLIC CHURCH*.

**Catholic Emancipation.** In Protestant countries, after the Reformation, penal regulations, and in some cases civil disabilities, were imposed on Roman Catholics. In both England and Ireland Roman Catholics could not purchase land, and where they held it by inheritance could be summarily displaced by the nearest heir, being Protestant; and Roman Catholics were not deemed fit to act as guardians even of Roman Catholic children. A Roman Catholic association was formed in Ireland in 1824, and Daniel O'Connell lent to the agitation the magic of his eloquence. In 1829 the Duke of Wellington at last introduced a measure which threw open to Roman Catholics the Houses of Parliament and most public offices. Roman Catholic bishops have since been tacitly allowed to assume territorial designations. In 1911, on the accession of King George, a form of oath was devised less offensive to the suscep-

tibilities of Catholic subjects (see CORONATION). As the law stands, the sovereign, the regent (when there is such), the lord chancellor, and the lord high commissioner to the Church of Scotland must not be of the Roman Catholic faith.

**Catholic Epistles, or General Epistles**, a title given to the seven letters in the New Testament traditionally associated with the names James, Peter (2), John (3), and Jude.

**Catholic Knights of America**, founded by Archbishop Feehan, in 1877, is a benefit society for Roman Catholics in the United States. It provides them with the usual advantages of fraternal organizations.

**Catholic League**, formed by the Catholic princes of Europe at Munich in 1609 to counteract the Evangelical Union formed by the Protestant princes in the previous year.

**Catholic Summer School of America**, founded 1892, is an educational institution modelled on the Chautauqua summer school, which meets every year from July to September at Cliff Haven, on Lake Champlain, New York. The School publishes *Mosher's Magazine*.

**Catholic Truth Society**, established in England in 1872 to assist both Roman Catholics and Protestants in obtaining a better knowledge and practice of the Roman Catholic Church by disseminating suitable works of instruction and devotion.

**Catholic University of America**, Roman Catholic institution of higher education, located in Washington, D. C., was incorporated in 1887 with the approval of Pope Leo XIII. It includes graduate and undergraduate courses, and is organized in five faculties—theology, law, philosophy, letters, and science. The archbishop of Baltimore is the perpetual chancellor, exercising his administrative functions through a rector appointed every six years by the Holy See. Affiliated with the University are St. Paul Seminary in St. Paul, Minn., and St. Paul College, the Marist College, Holy Cross College, the College of the Holy Land, St. Austin's College, College of the Immaculate Conception (Dominicans), the Oblates College, the Apostolic Mission House, Trinity College for Women and the Catholic Sisters College, all in the District of Columbia.

**Catholikos**, a title which seems to have been applied to the superintendent-general of missions, or of churches, on and beyond the borders of the Roman empire.

**Catilina (Catilina or Catalina, Lucius Sergius)**, born about 108 B.C. He was prætor

in 68 B.C., and governed Africa the next year. In 63 B.C. he formed a conspiracy to secure the government, and is said to have plotted the murder of the consuls in 65 B.C., only failing by giving the signal too soon. In 63 the conspiracy assumed more dangerous proportions; but Cicero denounced (Oct. 21, 63) Catiline and drove him from Rome. He fell at the head of his disorderly forces at Pistoria in Etruria, in a battle against Antonius. Consult E. S. Beesly's *Catilina, Clodius, and Tiberius*.

**Cat Island**. See **Bahamas**.

**Catkin**, is a crowded spike or tuft of small unisexual flowers with reduced scale-like bracts. Examples are found in the willow, hazel, oak, birch, alder, etc.

**Catlin, George** (1796-1872), American painter and writer, was born in Wilkes-Barre, Pa. His works include: *Manners, Customs, and Conditions of the North American Indians* (1841); *Notes of Eight Years in Europe* (1848).

**Catlinite**, or pipestone, an indurated clay shale occurring as a narrow seam in the heavily bedded quartzites of Southwestern Minnesota.

**Catmint**, or **Catnip**, a genus of hardy labiate plants with a five toothed tubular calyx, a corolla tube longer than the calyx, and its two front stamens shorter than the others. Its peculiar fragrance is attractive to cats.

**Catnip**. See **Catmint**.

**Cato, Dionysius**, is the name prefixed to a little volume of moral precepts in verse, which was a great favorite during the Middle Ages, but the author of which is unknown.

**Cato, Marcus Porcius** (234 B.C.-149 B.C.), frequently surnamed CENSORIUS or CENSOR, also SAPIENS ('the wise'), and afterward PRISCUS or MAJOR—to distinguish him from his great-grandson, Cato of Utica—was born at Tusculum, and was brought up on his father's farm in the Sabine country. He became quæstor in 204, served under the pro-consul Scipio Africanus in Sicily and Africa, was ædile in 199, and prætor the following year, when he obtained Sardinia as his province. In 195 he was raised to the consulship. In 191 he served in the campaign against Antiochus, and to him the great victory won at Thermopylæ was mainly due. He now turned himself strenuously to civil affairs, and strove with all his might to stem the tide of Greek refinement and luxury, and advocate a return to a simpler and stricter social life after the ancient Roman pattern. In 184 Cato

was elected censor, and discharged so rigorously the duties of his office that the epithet *Censorius*, formerly applied to all persons in the same station, became his permanent surname.

In 175 B.C. he was sent as ambassador to Carthage, and was so impressed by the strength of that city that for the rest of his life, whatever question was before the senate, he always introduced the phrase, *Delenda est Carthago* ('Carthage must be destroyed'). He wrote several works of which only the *De Re Rustica*, a collection of the rules of good husbandry, has come down to us.

**Cato, Marcus Porcius** (95 B.C.-46 B.C.),

is produced by reflection from numerous long parallel fibres which traverse the mineral. The resemblance to the narrow, elongated pupil of the eye of the cat is the source of the name. There are two varieties of cat's-eye, the Occidental and the Oriental. The former is quartz enclosing fine fibres of asbestos; in quartz cat's-eye the color may be white, pale, or dark gray, yellow, brown, green, or sometimes blue. The Oriental is far more valuable, and among Eastern peoples is one of the most highly prized of gems. It is chrysoberyl, with similar fibrous enclosures, and is much more beautiful, with a far finer lustre.



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named CATO THE YOUNGER, was educated in the house of his uncle, M. Livius Drusus. In 63 B.C., as tribune of the plebs, he strongly supported Cicero in the senate on the proposal that Catiline's fellow conspirators should be executed. Until the civil war between Cæsar and Pompey, Cato was an active supporter of the senatorial party; but after Pompey's defeat at Pharsalia (48 B.C.) he went to Africa, and joined Metellus Scipio, who was routed at Thapsus in 46 B.C. Utica held out; but Cato advised the townspeople to surrender for fear of provoking Cæsar's indignation. After spending a night in reading Plato's *Phædo*, he committed suicide by stabbing himself in the breast.

**Catoche, Cape**, the n.e. point of Yucatan, was the spot where the Spaniards first saw Mexico (1517).

**Cat's-eye**, an ornamental stone used especially for rings. It is always cut in a convex form; and when light falls on the rounded surface, a narrow bright line of paler color

**Catskill**, village, New York, county seat of Greene co., on the Hudson River, from which many summer resorts are reached; p. 5,392.

**Catskill Aqueduct**, one of the greatest engineering feats ever accomplished, whereby 500,000,000 gallons of water are daily conveyed to New York City from the Catskill Mountains, a distance of over 100 m., was authorized in 1905. The Ashokan Reservoir, at the northern extremity of the Aqueduct, is located about 500 ft. above sea level; it has an area of 13 square miles and a capacity exceeding 132,000,000,000 gallons. The tunneling, especially at Storm King, lying on the west shore of the Hudson River a few miles above West Point, where it reached a depth of 1100 ft., was constructed in the shape of an inverted siphon, and is still considered one of the most remarkable feats of modern hydraulic engineering in the world. The City Tunnel extension of the Catskill Aqueduct is in rock, 200 to 750 ft. underground.

